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ABSTRACT

This volume of a newsletter focused on the treatment and prevention of medical emergencies in the wilderness contains all six issues for the year 1993. Issues include feature articles, book reviews, product reviews, letters to the editor, notices of upcoming wilderness conferences and training courses, additional resources, and general information relevant to medical services and outdoor activities. Feature articles cover the treatment of anaphylaxis (shock); use of helicopters in medical emergencies; responding to diving emergencies; handling suicide attempts; products to disinfect water; and consideration of preexisting medical conditions such as asthma, seizures, diabetes, and hypoglycemia in the wilderness. (LP)

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WILDERNESS MEDICINE NEWSLETTER

1993 VOLUME 4, NO 1-6

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

January/February 1993 Volume 4, Number 1

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Anaphylaxis

by Buck Tilton

Even though less encountered than the other forms of shock, anaphylaxis still represents one of the most dramatic and life-threatening emergencies the wilderness care provider may have to face. Low estimates guess that 400 to 800 patients will die from anaphylactic shock this year in the U.S. Most of those people will be killed by a reaction to penicillin, perhaps over one-half. More than 100 may die from insect stings. Victims appear near death - indeed they are near death - yet proper care can reverse this condition.

Case Study:

Back at base camp you find one of your clients, a 25-year-old male, responsive only to painful stimuli. You find him sitting up, slumped against a tree. His head lies forward on his chest. His respirations are agonal, his blood pressure 80/40, his pulse 110 and weak. His skin is pale, cool and clammy. There is no noticeable edema. His pupils are slightly dilated and slow to respond to light. He is a known asthmatic. Another client reports the patient complained of a painful "sting" only minutes before.

Opening his airway eases his respiratory difficulty briefly. But the patient rapidly deteriorates - breathing becomes more and more labored, wheezes are audible,

(continued on page 2)

"Anaphylaxis"

(continued from page 1)

and, finally, respirations stop. You initiate rescue breathing, but the patient is very difficult to ventilate. Your patient goes into cardiac arrest, and you start CPR immediately. After 45 minutes there is no sign of life, and you decide you have done all that can be done. After recovery of the body, the medical examiner rules the cause of death to be anaphylaxis secondary to injection of bee venom.

Clarification of Terms

Anaphylaxis was first noted by two French doctors, Portier and Richet, in 1902. They described the difference between a normal **immune response**, the body's protection against invading substances that involves identification and destruction of those invaders, and an **allergic response**, in which the body overreacts to an invader producing a condition that may needlessly destroy healthy tissue.

An **antigen** is any foreign substance that causes the production of **antibodies**. Antibodies are the proteins that destroy or deactivate the foreign substance (a normal immune response). An **allergen** is a specific term for an antigen that causes an allergic reaction. An **allergy** refers to an individual's hypersensitivity to a substance that is normally considered harmless. **Anaphylaxis** is a term that means "without protection," and describes an acute, body-wide, severe allergic reaction. The terms anaphylaxis and anaphylactic shock are used interchangeably in this article.

Exposure to an antigen, and the resulting production of antibodies, is known as **sensitization**. As Portier and Richet discovered, first contact with an allergen will not cause anaphylaxis. In fact, it may take several contacts with an allergen before anaphylactic shock occurs.

"An allergy refers to an individual's hypersensitivity to a substance that is normally considered harmless."

Some Common Allergens

Allergens get into a human by the same routes as any poison does: injection, ingestion, absorption, inhalation.

Injected penicillin, as mentioned, generates more anaphylaxis than any other single cause. Venom from Hymenoptera stings (bees, wasps, yellow jackets, hornets, fire ants) may be the second most common allergen. Any member of the Hymenoptera Order may have a cross-sensitivity with other members, meaning, for instance, a bee sting may sensitize a patient for a later wasp sting. Injected antigens can often produce a very fast reaction.

Many foods and food additives cause anaphylaxis, but the reaction, since it comes from ingestion, takes more time to occur. Common food allergens include nuts, shellfish, legumes, and eggs. Common food additives include benzoic acid and sulfites.

What Happens to the Patient?

In anaphylaxis certain chemicals are mass produced by the hypersensitive patient. The primary chemical is histamine, but included are serotonin, bradykin, and a few others. These chemicals spread throughout the body causing unhealthy changes in the patient, three of which are of immediate concern: 1) blood vessels dilate, 2) capillaries become more permeable, and 3) smooth muscles spasm.

A variety of signs and symptoms may appear. Common responses include the skin and may involve urticaria (hives), itching, redness, and/or a marbled flushing, a rash, and swelling. The swelling (edema) usually becomes noticeable first in the face - eyelids and lips. Central nervous system changes may produce anxiety and lightheadedness. Smooth muscle spasm in the digestive tract may cause abdominal cramping, nausea, vomiting, or diarrhea. These signs and symptoms may or may not precede life-threatening complications.

Cause of Death

Swelling and muscle spasm in the airway (specifically laryngospasm), along with increased mucus production, can cause closure of the airway, the primary cause of death in anaphylaxis. The patient may exhibit stridor, may appear to be choking, and may complain of tightness in the chest or throat. These are unhappy indications.

Shock, if it occurs, will be due to dilation of the vessels and increased permeability in the capillaries. Anaphylactic shock is a combination of vasogenic and

hypovolemic shock. Dilation causes vasogenic (low-resistance) shock, and fluid shifts from the capillaries into the subcutaneous and extravascular spaces causes a form of hypovolemic shock. The resulting hypotension stimulates adrenaline release (so does histamine), and the patient shows increased heart rate, and pale sweaty skin.

For most patients, the signs and symptoms of full-blown anaphylaxis begin to develop from seconds to minutes after exposure to the allergen, but delays of an hour or more have been recorded. Early signs do not always indicate the severity of the reaction, but delayed reactions tend to be less severe.

Management of the Patient

1. Keep the patient's airway open and, if available, start a high flow of supplemental oxygen (often not available in the wilderness, of course).

2. Treat for shock by calming the patient, keeping the patient warm, and elevating the patient's legs if leg elevation does not increase the respiratory distress.

3. If respiratory function is compromised, it must be restored immediately - or death is imminent. The only way to restore adequate respirations is with an injection of epinephrine. Epinephrine causes peripheral vasoconstriction, restores normal vascular tone and permeability, and causes bronchial dilation. Shock is reversed and blocked airways are opened.

Epinephrine is best injected via a pre-loaded syringe, available by prescription only, in spring-operated auto-injection syringes and manually operated injection syringes. Despite the prescription-only sale of epinephrine, many doctors will be willing to consider your request for this drug. In remote areas, nothing else will save the patient's life!

Spring-operated syringes (EpiPen(R)) and EpiPen(R)Jr.) only require you to remove the protective cap and press the end of the device against someone's thigh with enough pressure to release the spring. Held in place for 10 seconds, the syringe automatically injects the epinephrine.

Manually operated syringes (Ana-Kit(R)) require you to dart the needle into someone's upper arm or thigh and depress the plunger until it will go down no further. Ana-Kits(R) come with a double-dose in each syringe. That means you get two injections for each syringe. This is often very important since epinephrine does not last long in the body and repeated injections every 10 to 15 minutes are not uncommon. In the past Ana-Kits(R) have been available only in a small plastic box that includes several unnecessary items. Now it comes syringe-only in a fountain pen sized container, taking up less space and weighing less.

"Epinephrine is best injected via a pre-loaded syringe, available by prescription only, in spring-operated auto-injection syringes and manually-operated injection syringes."

Directions for use of injectable epinephrine comes with each syringe. These directions should be read before you need to use the needle.

4. If and when the patient can swallow, they may be given an oral antihistamine. Diphenhydramine (Benadryl(R)) is the strongest over-the-counter antihistamine. The usual dosage is 50 mg. It takes about 20 minutes to get into action. Antihistamines prevent the release of more histamines and bind to histamine sites, preventing further damage to the patient's body.

5. All patients who have been injected with epinephrine should be evacuated for a physician's attention. The rate of evacuation will depend on the severity of the reaction, and the availability of epinephrine for subsequent use, if needed.

Prevention

There are no means to prevent anaphylaxis, other than identifying offending allergens and avoiding them. If you, or someone traveling to wild places with you, has a known susceptibility to an allergen (especially insect stings), you should have injectable epinephrine and a strong antihistamine in your wilderness first aid kit. It may stand between life and death.

Epinephrine Update

On October 15, 1992 the Medical Oversight Committee (MOC) of the group revising the EMT-Basic National Standard Curriculum for the U.S. Department of Transportation (DOT) released their announcement that administration of epinephrine by pre-loaded pen applicator will be included in the new curriculum. **

Editor's Note: About Dick Person

The author of the following two articles has resided in a tipi deep in the Yukon for almost 20 years. His knowledge of safe and successful cold weather living arises from depths of experience possessed by very few modern people. A biologist by training, Dick now guides lake and river canoe trips, teaches tipi and wilderness living, and lectures and writes on these topics. I had the pleasure of spending a couple of days with Dick recently and found him an able and knowledgeable teacher, a wealth of good information and good will, and a sincere and dedicated wilderness traveler. All outdoorspeople could benefit from spending some time with Dick. To reach him, write: Dick Person, Box 92, Teslin, Yukon Territory, YOA 1BO, Canada. We hope to publish more from Dick in the future.

- Ken Thompson

Porridge: A High-octane Kick-start

By Dick Person

As I jokingly tell my clients on summer canoe trips, "You can paddle 10 miles on a bowl of this porridge!"

They smile condescendingly as they nibble on the three or four tablespoonsful in their cups and wonder where the bacon and eggs are. They look with some astonishment at the ample bowls of it that I and the other guides are consuming.

A few days into the trip, however, as their muscles tone up and we increase our daily distance to 30 or 50 miles, they begin to wax enthusiastic (at least some do) about this high-octane, kick-starter breakfast food.

For a large part of my life, which has been active and outdoors, I was convinced that nothing less than a deer, elk, caribou or moose steak with eggs, toast and coffee would provide the needed energy and nutritional basis for a day of hunting, skiing, backpacking, mountain climbing or just plain wood-cutting and hauling.

Having also been a student of nutrition for many years, I reasoned that as long as I ate a reasonable amount of fruit and veggies, everything would be o.k. I was, however, unaware of the cumulative effects of over-consumption of protein and fate.

In my mid-50's, I received the strong body signal that all was not well. Immediate abdominal surgery was required to correct the condition and I recovered quickly. But it made me realize that my problem had been created by unbalanced eating.

While in the hospital, I decided to make some radical changes. My first meal was liquefied organic rice brought to me by a dear friend. I embarked on a natural foods diet high in grains, raw vegetables and fruits.

In less than a month after surgery, I was in Colorado teaching a winter outdoor living course for the Colorado Mountain College close to Aspen. Part of this session involved leading a group on snowshoes into the mountains, camping and doing various activities.

In my mind, I questioned whether I'd have the strength and the energy to handle this, especially as an instructor. But I had no problem, though I slept a bit cooler than usual.

During this time, a multi-grain porridge was my morning mainstay and I thrived on it. As I probed deeper into the study of complex carbohydrates and their role in nourishment, I came to realize that I'd hit on a gold mine.

Natural whole grains contain a wealth of micro-nutrients in the form of vitamins, minerals, more than ample protein, and insoluble fibre, that very valuable of ingredients.

This latter item is milled away in the majority of the processing of pasta and breads but has an indispensable role in the elimination of digestive leftovers.

It adds important bulk to the contents of the colon and provides a gentle scouring action on its walls that stimulates the peristalsis and thus easy elimination of the colon's material.

Constipation is a chronic problem among more than 70 percent of the North American population. It is due principally to a lack of fibre in the diet combined with inactive lifestyles.

Insoluble fibre, as found in uncooked fruits and vegetables, absorbs toxins in the intestines and carries them out in the stool. Pectin from apples is an example of an insoluble fibre.

Feeding your body's vital fires with refined carbohydrates and sugar is like throwing handsful of dry kindling in a stove.

Natural grains, on the other hand, are comparable to putting well-seasoned dry logs onto your fire and enjoying a steady output of heat and energy.

It was a revelation to me that first winter that I ate little or no meat and depended on grains to keep me warm and allow me to ski, snowshoe, cut wood, etc.

Not only did I have no problems, but I was blessed with abundant energy and a sense of well-being that has simply deepened over the years.

Mind you, now, this is more than a bowl of oatmeal I am talking about. But it doesn't take much longer to prepare.

In a three-quart stainless steel saucepan, put a half-cup of wheat (the whole grain) with a quart of water. Add similar amounts of whole oats, whole rye and barley grains, a seven-grain cereal mix, rolled oats and pumpkin seeds.

Frequently, I add quinoa (keen-wah) in place of the seven-grain mix. Quinoa is originally a Mayan grain grown on dry mountain slopes but is now doing well on the Canadian prairies. It contains a higher protein fraction than any other grain.

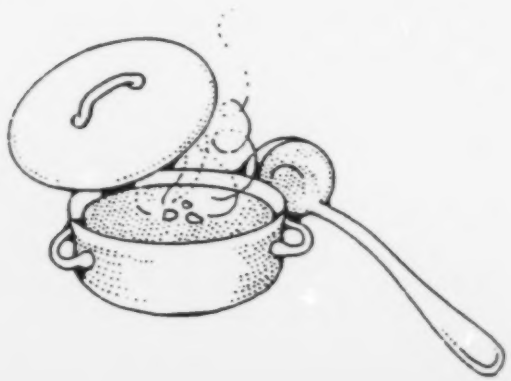
All of these Canadian grains can be obtained from the farm or health food stores.

Back to the stove. Add water until the pot is almost full. Bring to a boil but let simmer slowly, stirring occasionally. In about 20 minutes, when the rolled oats are creamy looking, it's ready.

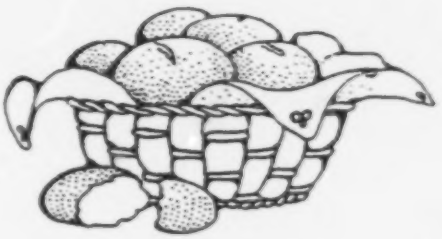
Although it can be eaten as is, I prefer to add a few tasty crunchy items. These include raisins or dates, nuts (especially almonds or walnuts), toasted sunflower seeds, a dab of honey or molasses, peanut butter or tahini (sesame seed butter, which is very rich in calcium), a spoonful of yogurt or milk, if preferred.

Ground flax (a coffee grinder works fine) is a nutrient bonanza. Not all these additions need be used at once.

So experiment to see what tickles your tastebuds. And the fringe benefit...whatever is left over can be refrigerated 'til you want another serving. It keeps well cold. **



Bannock: Natural Food of Nomads



By Dick Person

The poems of Robert Service entered the sphere of my reading and imagination at about the age of 13 or 14. It was there I first encountered the word bannock and became intrigued with its implications.

Being a form of bread baked usually in a frypan, it was obviously a food form of nomadic and itinerant people. In its earliest form, it was simply flour or meal, salt, water, and a leavening agent.

It undoubtedly has its roots in the Neolithic period when many people became growers of crops, grains in particular.

The word bannock is derived from the Gaelic, bannach, and referred to a simple cake made from oat, barley, or pease meal. It was a standard food of the Scot shepherds and others who roamed the moors.

It was brought to North America when Scots, early on, became employees of the Hudson Bay Company and was soon a favorite dish among the trappers, traders, and anyone who traveled the bush.

It has, therefore, a tradition firmly rooted in Canadian history, but, as I've discovered, it is still unknown to a large portion of Canadians. The many presentations I've made to people Outside about life in the northern bush has made me aware of how obscure the term has become.

In its original form, it was a very wholesome fare. It was ground from whole grains untouched by artificial fertilizers, pesticides or fungicides.

The milling and distribution of white flour began just after the turn of the century and was soon available in the Hudson Bay posts and other supply points throughout the North.

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"Bannock . . ."

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Using this flour as a base ingredient, baking powder, shortening (lard or bear grease), salt, sugar and water were added to create a moist dough. If you make too dry a dough, it's impossible for the baking powder to do its work and you may end up with, as one wag rhymed: "Who has not met with camp-made bread, rolled out of putty and weighted with lead?"

Many variations and additions can be done with the basic recipe and I'll mention some later. However, one important ingredient here is pretty constant and that is the even and consistent quality of the heat.

I get the best results when the frypan (preferably cast iron) and its shortening are just the temperature where a drop of water will actively dash about the pan but not crackle or pop.

If the pan is too hot, a crust will quickly form when the dough is put in. This crust thickens and insulates the interior and long before the bannock is done the crust is scorching, so be careful at this point.

In the bush, I divide my cook fire into two parts - one where active flames are boiling water, making tea, etc. and the other area where I rake coals for baking and broiling over the coals, as well as cooking in and under them.

A small grate over the coals is a great aid to supporting and keeping the pan level. Coals are distributed as evenly as possible and renewed from the active fire. I also rotate the pan 180 degrees every couple of minutes for even heating.

When the edge of the dough pulls away from the pan and the center area has no appearance of wetness, I carefully slide a metal cooking spatula around the edge and under the bannock. By tilting the pan a bit, the bannock will slide out onto a board.

A bit of shortening (bear grease is my favorite) is added and smoothed around the pan and then it's quickly put over the bannock and with one hand under the board, is inverted and returned to the fire.

I have found that this method of turning the bannock results in a much more even cooking of both sides than the usual way of baking the bannock to a state where it can be flipped over easily.

Cooking time is about 25 to 30 minutes total, although this will be lengthened with a slower fire or a heavier batter. When done, the crust has a springy feel when tapped with the fingers and a sliver comes out clean but moist.

It is also common to fry bannock in an inch or so of lard, a bit like doing doughnuts. But I seldom have that amount with me on trips and have become habituated to using a minimal amount.

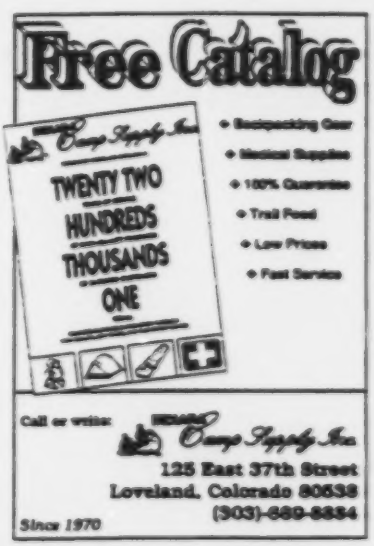
My own formula for bannock incorporates whole wheat flour (we grind our own) and variations on the usual recipe. I find the energy delivery and the "stick to the ribs" factor to be much greater with the whole grain flours.

Bannock

2 cups whole wheat flour
1 cup rye, barley or soy flour
1/2 cup rolled oats
1 tbsp. baking powder
2 tbsp. blackstrap molasses
1-3 whipped eggs
Enough water to make dough wet enough to drop off an inverted spoon in blobs.

The above recipe makes excellent trail bread. To create a dessert, I add chopped almonds or walnuts, dates or raisins, cinnamon, mace and allspice, or mix vanilla or lemon extract or whatever one's fancy comes up with.

Now with a hot beverage in hand, stretch out your legs by the fire, lean back and enjoy the wholesome richness of your creation. ••



The Backcountry Medical Concerns Of Puma Attack

By Jay W. Tischendorf and Buck Tilton

Evasion and Defense

Puma mountain lion attacks on people, although rare, have increased in recent years, probably because, in part, of our growing encroachment on the animals' domain. All outdoor enthusiasts should seek to avoid conflict with this secretive animal. Rules for safe living, camping, and traveling in bear country hold true for cougar country as well, and should be understood and followed. As for defense, unless you have had combat-level firearm training and are intimately familiar with the gun and ammunition, a capsaicin-based spray repellent is a safer, more effective, and more versatile weapon against wild-life attack.

Although all interactions with potentially dangerous wildlife are different, several courses of action are suggested. In the event of an unplanned encounter, attempt to back away at a slow, steady pace. Try to move upwind or toward a position of advantage. Avoid jerky movements. Avoid direct eye contact; instead, use peripheral vision to monitor the animal during your retreat. Never run away.

Keep in mind that not all encounters stem from aggression or evil intent. Pumas, for example, seem to have a history of following hikers and hunters and of investigating camps. Curiosity need not always kill the cat...or the bear...or the coyote. Remember, we are visitors to the animals' world. Understand their nature as well as your own. Treat them with respect.

Attack

Despite precautions, attacks may sometimes occur. In the case of the puma, ears held back, snarling or growling, or tail-twitching may indicate the animal's agitation and impending attack. In the event of a charge or attack, your instantaneous awareness of the situation may be the ultimate safety. Were you aware of the cat before it attacked, or was it a surprise? Are there signs of kittens, a den, or a kill nearby?

If the cat is defending family or food, the safest action is to minimize any threat by curling up tightly, offering no resistance, and feigning death. Protect your head and neck. Obviously, playing dead while a creature of such formidable tooth and claw wreaks havoc on your body requires willpower and presence of mind of an extraordinary kind.

"Remember, we are visitors to the animals' world. Understand their nature as well as your own. Treat them with respect."

If the mauling continues or the attack is a bona fide attempt at predation - as most puma attacks seem to be - fighting for your life may be the only alternative. Allow no quarter. Use any weapon and advantage available, be it gun, bug spray, knife, stick, dirt, or rope. One's hands, fingers, teeth, and sharp bony angles (i.e. elbows, knees,

(continued on page 8)

" . . . Puma Attack"

(continued from page 7)

heels, knuckles - especially thumbs) may be used effectively, especially if directed at vulnerable areas like the eyes, inner nose and ears, ribs, and abdomen (particularly where it meets the rib cage).

Leg scissors may prove useful in maintaining control of the cougar. Screams or guttural grunts increase your resolve. Companions should harass the cat as traumatically as possible while minimizing danger to the victim.

If bitten, try to avoid the instinctive urge to pull away. Instead, surprise the cat by charging forward and forcing the bitten part back against its mouth. Likewise, ramming a hand down its throat and clawing aggressively may interrupt breathing or disturb the animal enough that it will decide against pressing the attack.

The Aftermath

Following a puma attack, treat the patient as you would any victim of trauma. After ensuring that the scene is safe (i.e. Is the cat gone?), perform a careful primary and a very thorough secondary survey. Maintain spinal precaution until you can absolutely rule out the chance that damage has occurred. Treat for shock. Don't allow the high emotional pitch of the event to cause you to neglect these all-important basics.

Intermediate Treatment

Next, think hygiene; infection of all soft tissue injuries is a serious concern. Ascertain that your own hands are clean and then scrub, irrigate, debride, and flush (SIDF) each open wound. First, scrub the wound thoroughly. Be purposeful and firm. An antiseptic such as povidone-iodine, soap and clean water, or water alone, in descending order, work; although only with some antiseptic and detergents is there hope of killing the rabies virus. Water is disinfected, regardless of altitude, the moment it is brought to a rolling boil.

Rinse the scrub solution away. Irrigate the wound with a pressurized stream of fresh disinfectant or clean water to remove additional contaminants. A punctured plastic bag, squirt gun, or syringe can be used.

Any foreign matter or dead tissue remaining at this point needs to be eliminated by debridement - scrub again or use sterilized tweezers to pick the particles out. Remember, sterilization requires five minutes of boiling, plus an additional minute for each thousand feet of elevation above sea level.

Do a final flush before you dress the wounds. Dry sterile dressings, affixed with secure but not overly tight bandages, are best. Change at least every 24 hours. Puncture wounds and deep lacerations should be allowed to drain freely. If injuries are extensive, it is best to begin administering an antibiotic such as Keflex, if available. Do not apply petrol-based products to wounds.

Long-Term Concerns

Long-term dangers from wildlife attack include sepsis, tetanus, and rabies. Sepsis or infection can be prevented or treated with proper wound cleansing, hot saline soaks, and antibiotics. Watch for inflammation, pus, red streaks in the extremities, fever, and general malaise because uncontrolled infection may become systemic, as in septicemia or blood poisoning, and may easily lead to shock and death.

The incubation period of tetanus, caused by the widespread bacillus Clostridium tetani and commonly known as lockjaw, is two days to eight weeks. Two weeks is average. Symptoms include restlessness, headache, back and abdominal cramps, and, most commonly, difficulty in opening the mouth. Advanced cases display extensive muscular spasms and rigidity.

Three-fourths of tetanus deaths occur in the first week following exposure, typically in the elderly as a result of secondary respiratory problems such as pneumonia, relating to uncontrolled muscular contractions. Clearly, regardless of age, if symptoms are apparent within the first few days, the case must be handled as an extreme emergency.

Happily, tetanus can be prevented or reversed by a $5 to $50 inoculation, the cost depending on medical office overhead and fees. County health departments often

"Rabies, an infectious and always fatal disease, is the second most insidious virus on earth."

provide the service at minimal cost. Similarly priced boosters should be taken at least every 10 years thereafter to maintain sufficient antibody levels.

If you are diagnosed as having this next disease you are already dead...or soon will be. Rabies, an infectious and always fatal disease, is the second most insidious virus on earth. Found primarily in mammals and transmitted through saliva, the rabies virus travels from the infection site to the spinal cord and finally to the medulla of the brain, where it headquarters itself "'til death do us part."

Having reached the medulla, the rabies virus multiplies and continues spreading throughout the central nervous system. It also finds its way to the salivary glands, at which point the animal becomes infectious, able to transmit its sickness not only through biting, but in any way that its saliva can enter the bloodstream. Corneal transmission of rabies has been documented.

The incubation period of rabies, the time from exposure to the onset of symptoms, ranges from 10 days to one year, depending on the location of initial infection. Three weeks is about average. There is no known cure. Victims may suffer from flu-like symptoms, irritability, depression, insomnia, stiff neck, hallucinations, and twitching. These soon progress to seizures and bizarre random behavior, even including biting at those who approach. Extreme pain during attempts to swallow leads to uncontrollable drooling and apparent fear of water, or hydrophobia. The final stages are paralysis, coma, and soon after, death.

On the bright side, the odds of contracting rabies if exposed to the saliva of an infected animal are only four in 10. Before you gamble your life and decide against the costly option of receiving the rabies vaccine, you will want to evaluate:

1) **The Attacker**: skunks, raccoons, bats, cattle, dogs, and cats are high-risk groups

2) **The Nature of the Attack**: provoked or unprovoked

3) **The Local Incidence of Rabies**

4) **The General Behavior of the Animal**: fearless, aberrant, atypical

The decision is simple if the animal can be held in confinement and observed for the unmistakable signs and symptoms of the disease, if its brain can be tested for the virus, or if it is a pet whose vaccine history is known.

Having wisely opted in favor of the 5-injection series, given now in the arm instead of the abdomen, you can expect to pay up to $1,000, an amount at least partially dependent on the availability of the vaccine. Your margin of safety increases if the series is begun within 72 hours of exposure. This same series is used in pre-exposure treatments of veterinarians, animal welfare officers, and others in high-risk professions. **

1993 SOLO Courses

Advanced Leadership & Emergency Care (ALEC)

Dates & Locations:
- June 21 to July 23: SOLO

Hours: 160+

Cost: $1,325 to $1,550

Outdoor leaders need a balance of wilderness medicine and leadership skills along with prevention, survival, and rescue training. Our month-long ALEC program not only fulfills the DOT First Responder, SOLO First Responder, and National Ski Patrol's Winter Emergency Care curriculums, but also goes beyond both First Responder and EMT objectives with a week-long environmental emergencies segment and several sections on medical problems traditionally not addressed in either standard or wilderness pre-hospital courses.

Wilderness First Responder

Dates & Locations:
- March 28 to April 4: SOLO
- April 5 to 16: Appalachian Mountain Club, NH
- May 8 to 18: Wolfcreek, GA

Hours: 80+

Cost: $675*

Wilderness EMT

Dates & Locations:
- March 15 to April 9: SOLO
- April 19 to May 4: SOLO
- May 17 to June 11: SOLO
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WMN Dispatches

Lyme Disease Update

Once again we find Lyme disease in the news, this time the report coming from The New England Journal of Medicine. **Ixodes dammini**, the deer tick, still reigns as the primary reservoir for the disease in the northeastern and midwestern U.S. The question faced by a long list of researchers was: "...how to manage the care of persons who are bitten." The answers appear to give us two reasons to relax more during tick season: 1) almost all deer ticks must be attached for at least 48 hours in order to transmit Lyme disease, and 2) almost all patients who do develop Lyme disease will also develop the distinctive, well-defined, darker-border-than-center rash.

In a double-blind, placebo-controlled trial in southeastern Connecticut, where Lyme disease is endemic, 387 subjects randomly received either amoxicillin or placebo after positive identification of deer tick bites. **Borrelia burgdorferi** (the Lyme disease causing spirochete) developed in 2 of the 173 subjects (1.2 percent) who received placebo and in none of the 192 subjects receiving amoxicillin.

The researchers write: "When ticks were attached for less than 48 hours, **B. burgdorferi** was transmitted only rarely by infected nymphalstage ticks and never by infected adult female ticks." In test animals, 83 percent were infected after a tick was attached for 72 hours, and 100 percent after a tick was allowed to feed to repletion (more than 120 hours).

On the basis of this information, the researchers say: "...we conclude that the risk of Lyme disease after a recognized deer-tick bite is very low, even in areas in which the disease is endemic. Erythema migrans (the distinctive Lyme disease rash) will develop in the overwhelming majority of untreated persons with a recognized tick bite who become infected with **B. burgdorferi**. The risk of serious late sequelae in such persons is unknown, but certainly is very low - probably only a tiny fraction of 1 percent."

Furthermore: "...the risk of infection with **B. burgdorferi** after a recognized deer-tick bit is so low that prophylactic antimicrobial treatment is not routinely indicated."

And finally: "It is especially important to detect and to remove ticks as soon as possible, since transmission of **B. burgdorferi** is unlikely if a deer tick is removed within 48 hours of attachment."

Shapiro, Eugene D., MD, et al: "A controlled trial of antimicrobial prophylaxis for Lyme disease after deer-tick bites."

The New England Journal of Medicine. December 17, 1992. **

Cold Weather Myths and Misinformation

1. You need to eat more in winter.

If you use winter as an excuse to put on extra weight, you're wrong. It's true that body fat insulates, but bundling up in cold weather clothing eliminates the advantage of chubbiness. And some people never spend a significant amount of time outdoors in winter. They just sit near the fire eating more because it's cold outside. Just sit nearer the fire!

However, active outdoor folks will burn more calories. That's true in any season. Strenuous cross-country skiing can "eat up" 600 calories per hour. And altitude adds to the calories burned. Above 15,000 feet your metabolism may kick up to twice what it is at sea-level during periods of exercise.

Sitting around outside in the cold can theoretically cause you to use more calories. If you start to shiver, you may increase internal heat production by as much as 400 percent...and, of course, you'll utilize a lot of calories that way. Maybe that would be a great weight-loss plan!

Overweight people could sit around outdoors in the winter inadequately dressed and shiver off the extra poundage.

2. You can drink hot liquids to warm up in the cold.

According to Dr. Murray Hamlet of the U.S. Army Research Institute of Environmental Medicine (USARIEM), you'd have to down a full quart of liquid at 130 degrees F in one sitting to add a measurable amount of heat to your core. That's a huge tea cup! And that much hot liquid may dilate your peripheral vasculature enough to make you feel warmer when you're actually losing a bit of heat from your skin. Besides, hot liquids get inside you slower than cooler liquids...you have to sip them.

You need plenty of water to stay warm in winter, but drinking hot liquids is not the best way to stay hydrated. They may give you a psychological lift...which is healthy...but, for most of the time, drink lots of cool or cold liquid to stay warm in winter.

3. A little nip of alcohol helps prevent cold injury.

As William Forgey, MD, writes in his illuminating book, Hypothermia: Death By Exposure (ICS Books, 1370 East 86th Place, Merillville, IN 46410): "While it is permissible for chilly skiers to enjoy hot toddys around a fireplace in a ski lodge, it would be a mistake to enjoy the warm flush of alcohol if there were any chance of being exposed further to cold temperatures. The use of alcohol would have lowered the core temperature somewhat already and would have further blocked the important vasoconstriction protective mechanism for preventing further body heat loss.

"... for most of the time, drink lots of cool or cold liquid to stay warm in winter."

"A further problem with the use of alcohol when traveling in wilderness situations is the obvious effect which it has on mental function."

"But do not mistakenly think alcohol is useless in the wilderness. As Doc Forgey continues in his description of the field treatment for immersion foot: "...Provide an ounce of hard liquor (30 ml) every hour while awake and 2 ounces (60 ml) every 2 hours during sleeping hours to vasodilate and increase the blood flow to the feet."

Make mine immersion foot! **

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

March/April 1993 Volume 4, Number 2

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Never Cry Helicopter

By Buck Tilton

"Suddenly, the Alouette III plummeted like a broken elevator. Porter throttled the engine full and steered for a huge crevasse as we careened past the surprised faces of the ground team, then down into the blurry cobalt-walled hole, skimming its white floor at 90 mph until we shot out the end of the hanging glacier over 8000 feet of space. Porter said nothing, his white-knuckled hands clutching the stick, his face an L.A. expressway of sweat. But our night had only begun."

Jonathan Waterman, author of Surviving Denali, drew from his experiences as a climbing-and-rescue ranger in Alaska to produce the article "Never Cry Wolf" for Climbing magazine. Poignantly, Jonathan wrote on:

"Whether rescues occur in the Alaska Range, Yosemite, or the Tetons, they are risky and expensive. Victims seldom take responsibility for their rescues, financially and otherwise. In this country, it is assumed that a cry for help will bring immediate salvation. Of course, the essence of a rescuer's work is humanitarianism, and it is indeed a noble profession.

"But isn't a rescue a gift? Shouldn't a rescued victim take more responsibility and at least return the gift, or pay the bill?"

When you call for a helicopter, do not underestimate the danger or the expense. "A good definition

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Never Cry Copter

(continued from page 1)

of...responsibility," says Jonathan, "is to avoid calling a rescue at all costs, short of dying."

Capabilities

Helicopters are rotary wing aircraft, classified, for our purposes as Large and Small, Civilian and Military. They can all climb and drop, under normal conditions, at steep angles, which allows them to fly into confined and unimproved areas. Due to their wide speed range and high maneuverability at slow speeds, helicopters can fly safely and efficiently at low altitude. Landings and takeoffs can be made when visibility is poor. They do not have to land in order to load and unload, but the risk of accident when loading and unloading while hovering close to the ground increases dramatically. Cargo (including patients) can be transported as an external (sling) load, allowing pickup and delivery to areas not accessible by any other means.

Limitations

Helicopters go where the pilot wants to go because of the rapid spinning of two blades. The large overhead blade(s) creates lift by forcing air down. The pilot can vary the angle at which the blade attacks the air and the speed at which it rotates in order to vary the amount of lift. The entire rotor can be tilted forward, backward or sideways to determine the direction of travel. Without a second blade spinning in an opposite direction, the helicopter would turn circles helplessly in the air. Some large helicopters have two large overhead blades that spin in opposite directions, but most helicopters used in wilderness rescue maintain stability with a small tail rotor.

When they are close to the ground, the spinning blades build a cushion of air that supports the helicopter. But this cushion of air varies in its ability to work depending on its density. Rising air temperatures and increasing altitude reduce air density. So trying to land high in the mountains on a hot day is dangerous for a helicopter. The weight of one person may eliminate lift-off.

Helicopters use a large amount of fuel, which limits their range. Hail, sleet, icing and steady winds (at 40 knots or more) or gusty winds (gusting to 15 knots) may prevent the use of helicopters.

Summoning the Chopper

Civilian helicopters are available in some parts of the United States, helicopter rescues are available in some national parks, e.g. Denali, and protocols for summoning those services vary with the region. It is your responsibility to know, before going into a wilderness area, if civilian rescues are available and how to summon one. If need for a helicopter arises and you find yourself ignorant of how to request aid, contact the nearest police or sheriff's department.

To request a military helicopter, you need to use, also, the established protocol for the region in which you are traveling. In most States, the contact person is the local Sheriff or the local Search-and-Rescue (SAR) coordinator. Exceptions to this general rule, known to us, are 1) New Mexico, where you contact the State Police who, in turn, contact the State Police SAR coordinator; 2) Alaska, where you contact the State Troopers; and 3) New Hampshire, where you contact the State Fish and Game Department.

The Sheriff, etc., will determine what assets are available and if military assistance is deemed feasible and/or appropriate. If the decision is to "go for it," the Sheriff forwards the request to the Rescue Coordination Center (RCC) at Scott Air Force Base, Illinois. The RCC determines what assets are available, and contacts the nearest unit to see if they can handle the mission, or even if they want to get involved.

Here is the point: your heartfelt appeal from some wilderness area passes through complex channels and 95 percent of the time reaches the military helicopter garbled and incorrect.

In addition, the military is sensitive to the fact that they do not want to offer services or assistance when civilian commercial services are available. And when the military helicopter arrives, it may or may not have medical personnel on board. If the helicopter is large enough, you should consider sending the victim's gear and a care-provider with the patient.

Most civilian helicopter services will know the nearest appropriate medical facility, but the military helicopter

"Never walk behind a small helicopter, where the invisibly-spinning tail rotor waits like a man-eating Cuisinart."

may not. If the injury is life-threatening or, at least, very serious (and we hope it is, since you called for a tremendous use of assets and you are risking the well-being of rescuers), it is important that you know the nearest appropriate facility, which is often not the closest hospital. Time, and possibly the patient, will be wasted by going to an inadequate facility.

Establishing a Landing Zone

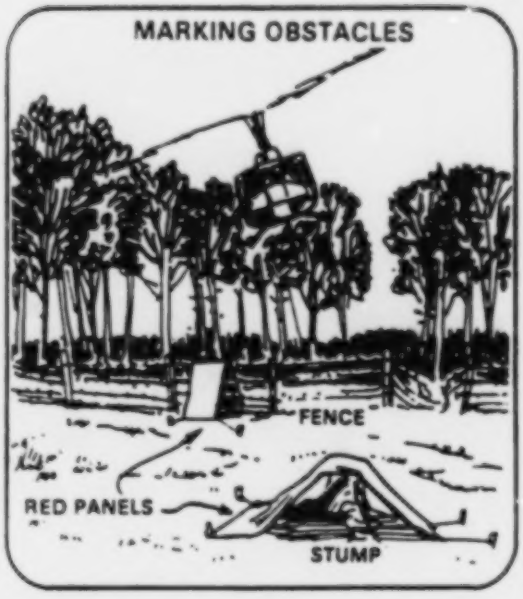
Site Selection: If possible, move well away from your campsite to select a landing zone (LZ). Rotor wash may blow tents, loose gear and campfire sparks over a large area. The LZ should be as level as possible.

Size: Small helicopters need an LZ approximately twice the diameter of the blades, at minimum. Most helicopters can land safely in an LZ of 30 to 35 meters (100 to 115 feet). At night, they require an even larger area in which to land safely. Don't let your feelings be hurt if the pilot doesn't like your site and chooses another.

Surface Condition: The surface of the LZ must be firm enough to keep helicopters from bogging down, from raising too much dust or debris, or from blowing snow. You should remove all loose debris that may be picked up by rotor wash and carried into the rotor blades or engines. You should pack down snow until it is firmly set.

Ground Slope: If the ground slope is greater than 15 percent (8 degrees), helicopters cannot land safely. When it is less than 7 percent (4 degrees), they should land upslope. In areas where ground slope is from 7 to 15 percent, helicopters must land and park sideslope.

Obstacles: LZs should be free of tall trees, telephone or power lines, and similar obstructions on the approach and departure ends. You may use an obstacle ratio of 10:1 (for example, a 10-meter, or 33 feet, tree needs 100 meters, or 330 feet, of horizontal clearance for landing or taking off). Smaller obstacles, e.g. stumps, rocks, holes, that cannot be removed from the LZ must be clearly marked.



Approach/departure Directions: The direction of landing should be generally into the wind. However, if there is only one satisfactory approach direction because of obstacles, most helicopters can land with a slight crosswind or tailwind. The same considerations apply to their departure. Ground personnel should indicate

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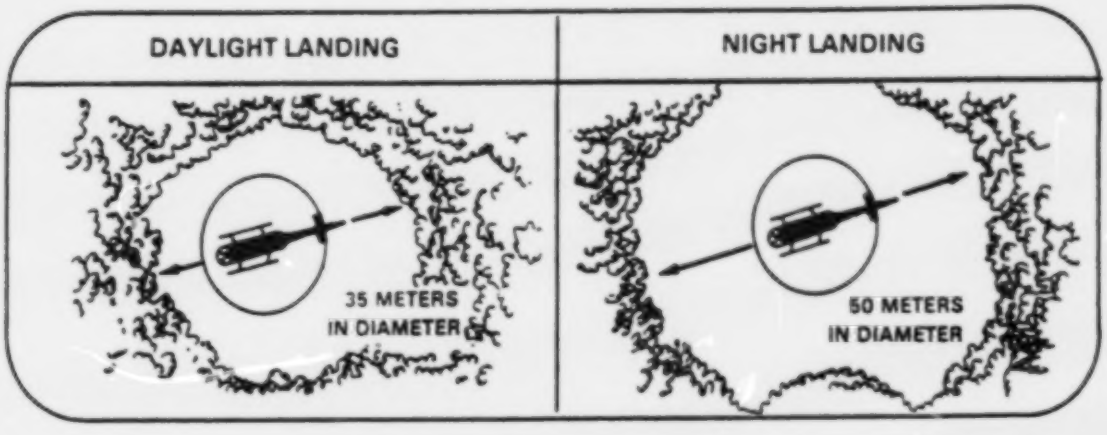


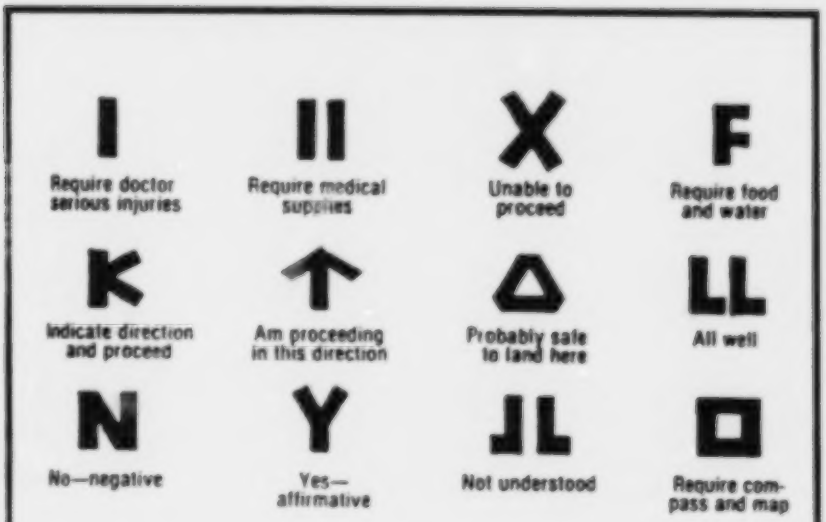
...Copter

(continued from page 3)

wind direction by building a smokey fire near the LZ, holding a light piece of cloth up as a windsock, or, with no other means, holding both arms horizontal to the ground while pointing in the direction the wind is blowing.

Loads: Most helicopters cannot take off or land straight up or down when fully loaded. If a full load is anticipated, a larger LZ and longer approach and departure routes may be required.

Marking The Lz: In daylight hours, small smoky fires or bright-colored fabrics may be used to mark an LZ. All fabric markers must be heavily weighted to prevent them from flying away. For night, lanterns, flashlights, chemical lights and/or fires (if necessary) may be used. All obstacles must be marked for day and night landings. There are many ways to mark an LZ at night. The lighted "T" is one way. The cross of the "T" should run horizontal to the wind, while the stem of the "T" runs with the wind, indicating the landing point to the helicopter.



Ground-To Air Signals

Make them in an open area near camp. Tramp out in snow or sand a big as you can. Line with boughs or stones for shadow and contrast. Burn grass, turn over sod, or lay out any material that might be seen. Geometric designs will catch attention of aircraft overhead. Such signals work even if you are asleep or ill when help comes. Destroy upon rescue.

Helicopter Safety

1. Never approach a helicopter until given an OK from the pilot or a crew member. At night a flash of the landing lights indicates an OK to approach. Approach from the 10 to 2 o'clock position. The nose of the aircraft is 12 o'clock. In large helicopters with two large blades, the 10 to 2 rule does not apply. Wait for directions from a crew member. Never walk behind a small helicopter where the invisibly-spinning tail rotor waits like a man-eating Cuisinart. On a slope, always approach a helicopter by starting downhill and climbing up to the aircraft.

2. Stand well clear on landings and take-offs. Rotor wash can be significant and dangerous. If the helicopter can lift its weight plus cargo, it can certainly be considered potentially dangerous to those left on the ground. Foresight is better than loss of sight.

3. When approaching, be aware that the blades on some helicopters droop down to 5 feet 4 inches off the ground. If approaching with skis, packs, ice axes, etc make sure it is lower than your head...and your head is lower than the droop of the blades. If you are carrying a patient as a team, GO IN TOGETHER and GO OUT TOGETHER. Remove hats. If eye and/or ear protection is available, use it.

Patient Safety

1. Patients on boards or in litters must be adequately secured before approaching the helicopter.

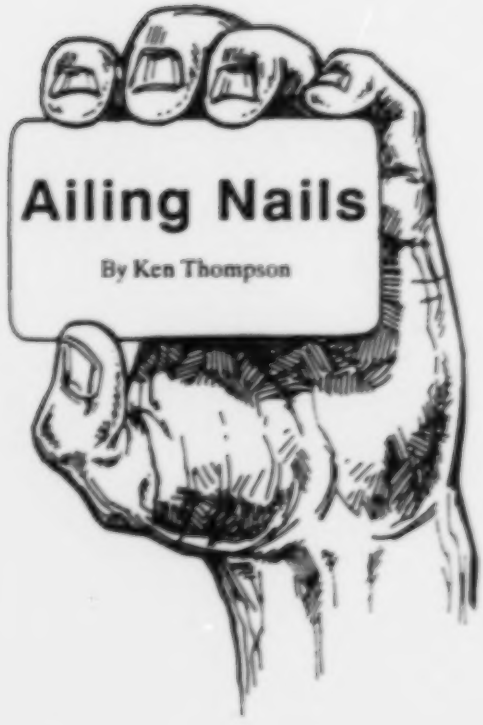
2. Vital signs should have been taken, if possible, within the last five minutes, and someone involved with patient management needs to be ready to give a medical report to a crew member, preferably in writing.

3. Patients need to be protected from the noise and the rotor wash, as well as from the significant windchill created by the rotor wash.

If nothing else, it is well that as many people as possible understand some of the ramifications of calling for helicopter support. "In the future," writes Jonathan Waterman, "perhaps rescuers should react differently. As the ranger leans out the airdrop door, he should loose only a hot-loaded handgun, padded with a note...

"...Chopper pilot gone fishing, rangers out to lunch, but there is a bullet for each of you...

"P.S. Never cry wolf." **



Ailing Nails

By Ken Thompson

The clouds clear and you find yourself basking in a remarkable 45 degrees of warmth, a brilliant beginning to four days of backcountry skiing in New Mexico. Spirit soaring, but ever mindful of practical details, you toss your keys into your pack, lock your car door, and slam it shut. Immediately, you sense that something is awry. For starters, you find that you are unable to walk away from the car. Then it sinks in: pain sensors rather rudely inform you that your thumb is somehow caught in that airtight seal at your door frame. After several seconds of weird contortions, wild gyrations, and downright foul language, you manage to extricate yourself.

The momentary relief of pain is soon lost in the darker knowledge of what is to come: the scourge of car campers everywhere: subungual hematoma. Soon blood, leaking from hundreds of crushed capillaries, begins to fill the space between thumbnail and flesh. Dull throbbing becomes sharp stabbing, and soon you gain new appreciation for the horror that thumbscrews must have instilled in the minds of medieval peasants.

As insignificant as they may seem, fingernails are important to us. They protect the ends of our fingers when we flick insects from our sleeves, they provide added dexterity and precision when we tie small knots, and they supply the necessary counter-pressure for things like punching this article into a computer keyboard. It is this same toughness and resiliency that leads to problems when a crushing force is applied to a fingertip. Having nowhere else to go, the inevitable swelling is applied directly to the sensitive and delicate nail bed, causing unrelenting pain. Fortunately, relief may be at hand.

The procedure, known as trephination, is relatively simple and nearly always provides immediate relief.

Step 1

Make sure that the source of the pain is a subungual hematoma. You are looking for four things: a crushing force, throbbing pain, a visible bruise under the nail, and a completely intact fingernail.

Step 2

Place a gauze sponge under the injured digit and rest the hand on a firm surface (bent knees often seem to be in just the right place). Keep another gauze sponge handy. Wear gloves and glasses if you have them.

Step 3

Cleanse the nail and surrounding area with whatever you would use to clean an open wound (a povidone-iodine solution is great).

Step 4

Bend one end of a paperclip out so that you have a stabbing tool to work with. Wrap the other end of the clip in tape (this will become your handle). Heat the business end of the paperclip over a flame until it is red hot. Then, touch that red hot point to the ailing fingernail at the center of the bruised looking area and push gently (remember, your goal is to go through the nail only, not through the entire finger). If all goes well you should hear a pop or click as the clip burns through the nail. With any luck your next action should be to capture, in that extra gauze sponge, a copious geyser of blood that will come spouting forth. If your device cools off before you burn completely through the nail, just heat it up and try again in the same spot.

Note: Two other implements that will make a serviceable red hot poker include the eye of a sewing needle and an 18 gauge syringe needle, both of which have built in blood grooves but do not retain heat as well. Alternately, almost any piece of stiff wire should work.

Step 5

Cleanse the wound you have just made, add a little antibiotic ointment if you have it, and apply a band-aid. Your patient will be greatly relieved.

In the May, 1991 edition of The American Journal of Emergency Medicine, D. Seaberg reports on 48 patients who received this treatment in a hospital ER. All reported an immediate reduction in pain. Forty-five had no complications; three developed slight problems, one of which was a minor infection.

This technique is an invasive procedure normally done in hospitals. But, it can be a real trip saver for those who choose to give it a try. ••

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Pesky Biters Are In Blood-letting Modes

by Dick Person

In Taoism, there is a yin-yang aspect to every phenomenon and hence the yin-yang will represent the female and male, up and down, and night and day. It is the latter phenomena that will be considered here.

I am referring to sex, the aerial kind and the two times of day the most common insects of the North, the mosquito and blackfly, are in blood-letting modes.

In addition to different circadian rhythm, they also breed and develop in different aquatic habitats. The mosquito does it in still or stagnant water and the blackfly needs moving water to aerate its developmental stages.

The blackfly larvae attach themselves to rocks with silken threads, a sucker and hooks, and look like a moss-coating on the rocks when they are in high numbers.

Skeeters, on the other hand, lay their eggs singly on quiet water or in dampish places that are subject to flooding. Shortly after, they become larvae or "wrigglers," as they are commonly known. On sunny days they dance the hula just under the surface film, and can be easily observed.

Interestingly, most mosquito species produce only one, or at most two, generations per season. Considering that most kinds live less than 30 days, and that they don't disperse very widely from their hatching site, it might seem reasonable to think that their season of activity would be more limited. The complicating fact is that we are dealing with a number of species whose hatches emerge at over-lapping times.

For instance, early in the season, the Unmarked Slender Mosquito (its official common name) of the genus Culiseta is abroad. It's the large slow one that allows its intended victim ample time to strike and kill.

An unusual feature of Culiseta is that it winters over as an adult under leaves and duff, and is the first mosquito active in the spring. Maybe it flies so slowly because of arthropodic arthritis acquired over the winter.

Before Culiseta has given up its ghost, a host of replacements have come on scene. I've been unable to locate any definitive studies for North of 60 degrees, but British Columbia has more than 45 different species and I doubt that more northerly areas are far behind.

This is a very brief semi-scientific profile of the creatures in question, but we must get to the meat of the problem (i.e. how to deal with the ornery critters).

Back when I was in my middle teens, I was pretty much full grown and was able to get a job with the forest service working on a pine blister rust eradication project. Any species of current or gooseberry served as the intermediate host for this deadly rust fungus. It was our job to march through low-lying swampy terrain pulling them out and destroying the shrubs.

In the Canadian shield country, on the north shore of Lake Superior where we were doing this, the density of mosquitoes and blackflies was phenomenal.

We wore thick wool shirts which they couldn't bite through (though they were hot as hell) and there were times when one could hardly distinguish the black squares from the white on the buffalo plaid pattern! As one poured a cup of tea, its surface was immediately covered with blackflies.

"Developed by the U.S. military for soldiers engaged in jungle fighting in Southeast Asia, "jungle juice," as it was called, heralded a new age in keeping insects from attacking the exposed and delectable human body."

On the bad days when it was hot and still, we wore head nets. They do work through they increase the sweating quotient considerably and the world is seen through kind of a "mesh haze."

On cooler days, or when breezes were blowing, we relied on "skeeter dope" (repellent was a term to come later) and a Foreign Legion-styled cap arrangement with cloth around the back and sides of the neck.

This was achieved by tying together adjacent corners of a large bandanna, putting it over the head, and setting one's cap or hat over it. Liberally dosing it with "dope" made it quite effective and the same was applied to any exposed skin.

Now just what was this "mosquito dope?" Most commonly it was citronella. For those not acquainted with this volatile substance, it is an oil derived from a southern Asiatic species of lemon grass.

If one is downwind of the wearer of this "perfume" (meaning sweet scent), it's not uncommon to pick up the odor from 50 yards away.

With a volatility of this level, it was common practice to mix it with a liberal amount of castor oil or carbolated Vaseline. This made its effects last much longer. My favorite mix was one ounce of citronella, one ounce spirits of camphor and a half-ounce oil of cedar.

This may sound antiquated to a generation of spray can users, but it is effective, biodegradable, and concoctable by the average human and one's body is not subject to the toxic effects of current repellents.

Developed by the U.S. military for soldiers engaged in jungle fighting in southeast Asia, "jungle juice," as it was called, heralded a new age in keeping insects from attacking the exposed and delectable human body.

Regardless of the brand name, Cutters, Off or Muskol, the basic effective ingredient is diethyltoluamide, known better as its acronym DEET.

It's claimed that the higher the concentration of DEET, the more "bang for your buck." Percentages vary from 30 to 100.

It is further advised that people with sensitive skin, or those who are allergy-prone, should use the lower levels of DEET concentration if it's to be used on an extended basis.

So you've got a bottle of one of the 100-percenters - what now? Just pull out the plastic insert that allows single drops at a time, and decant your bottle into two others of the same size, leaving a third in each one.

Now fill your bottle with vegetable oil and a few drops of wintergreen, rosemary or lavender oil and you're all set. You now have three bottles for the price of one. This mix is also much nicer smelling, longer lasting and much less toxic to the body. I have done this regularly for years and know it works well.

Let's look now at supplemental things we can do to reduce the insect problem. Again, the U.S. military did extensive testing with clothing and found that lighter hues are less attractive to biters and stingers.

They learned that clothing should be worn loosely and that the fabric must be thick enough to prevent the proboscis from getting through. I've found, too, that layers work especially well, as there tends to be some shifting between them. That action pinches off the fragile proboscis.

However, blackflies present a somewhat different situation, in that if they don't get you on direct frontal attack, they crawl in under shirt cuffs, neck bands, hats and caps, under your beltline and around boot tops.

Since you can't feel them bite, they can inflict considerable damage before you are aware of it. As with mosquitoes, reactions vary widely. For some, a few minutes of itching, with just a mark at the bite site, is the only result.

"Frequently, I put a smear or two of repellent along the back section of my hat brim to protect the exposed neck and ears. I keep DEET away from my skin as much as possible."

For others, swelling, reddening, a burning itch and even suppuration occurs. Blackflies often do kamikaze dives into the eyes, and if you have children along, I'd suggest making head nets mandatory.

Application of repellent to clothing works well, especially around any potential entry points as mentioned above. Wear pants long enough that they can easily be tucked into boot tops. And don't forget to have gloves along for hand protection.

Frequently, I put a smear or two of repellent along the back section of my hat brim to protect the exposed neck and ears. I keep DEET away from my skin as much as possible.

Speaking of clothing and repellent use, the ultimate garment is the hooded mesh jacket impregnated with repellent. It is extremely effective, light and compact and so it is easy to carry. Its potency is easily renewed with a sprinkling followed by enclosure in the sealed bag.

Such tactics as selecting campsites on non-brushy gravel bars or rivers or on points jutting into lakes open to prevailing winds and pitching tents well above water level can work wonders even at the height of bug season.

Winds approaching 15 kilometers an hour will absolutely squelch insect activity and, of course, if the temperature begins to fall towards 4 or 5 Centigrade that will have the same effect.

One last word as a survival note - if your repellent has been forgotten or lost, and you are in bug-infested country, improvise!

Humans and other animals have gone out of their minds or died of blood loss due to insect bites. Peeling strips of fresh bark off spruce trees and rubbing the sap on your face will repel insects, and thick mud, or even peanut butter smeared on is effective.

You may look pretty wild for a while, but you will live through it! **

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Wilderness Rescue Training: where To Go

In order for an outdoor instructor, guide or enthusiast to meet the moral, ethical and legal responsibility for themselves and their group in the wilderness, rescue training is a must. The following is a partial list of organizations that offer training applicable to different wilderness activities.

General

Emergency Management Consultants

P.O. Drawer 6870, Santa Barbara, CA 93160-6870. (800) 227-9281. Search and rescue courses, several levels of rope rescue courses.

Emergency Response Institute

4537 Foxhall Drive NE, Olympia, WA 98516. (206) 491-7785. Basic search and rescue training, publish information and course material on rescue, consulting, will refer you to training you need.

Kurt Hahn Leadership School

121 N. Sterling Street, Morganton, NC 28655. (800) 841-0186. High angle rescue, ropes course rescue, and a comprehensive Instructor Development Practicum.

National Association for Search and Rescue (NASAR)

P.O. Box 3709, Fairfax, VA 22038. (703) 352-1349. Several different levels of search and rescue training, and basic water rescue.

National Outdoor Leadership School (NOLS)

P.O. Box AA, Lander, WY 82520. (307) 332-6973. All kinds of wilderness rescue courses taught, offered primarily for NOLS staff.

Rigging for Rescue

RR 1 Site 3C Box 27, Invermere, BC, VOA 1KO, Canada. (604) 342-6042. Very intensive rope work course, applicable to all forms of rescue from mountain to river to cave.

Stonehearth Open Learning Opportunities (SOLO)

RFD 1 Box 163, Conway, NH 03818. (603) 447-6711. Backcountry rescue, beginner and advanced levels of high angle rescue, basic water rescue, swiftwater rescue, taught in conjunction with SOLO-Wilderness Medicine courses or independently.

Wilderness Medical Associates

RFD 2 Box 890, Bryant Pond, ME 04219. (207) 665-2707. High angle rescue, swift water rescue, usually offered in conjunction with wilderness medicine courses.

Wilderness Medicine Institute

P.O. Box 9, Pitkin, CO 81241. (303) 641-3572. Basic essentials of backcountry rescue, basic water rescue, high angle rescue, swiftwater rescue, taught in conjunction with SOLO-Wilderness Medicine courses or independently.

Wilderness Professional Training

P.O. Box 86, Crested Butte, CO 81224. (303) 349-5939. Wilderness and rock rescue taught in conjunction with wilderness medicine courses.

High Angle and Alpine Rescue

American Alpine Institute

1515 12th Street, Bellingham, WA 98225. (206) 671-1505. Very comprehensive mountain rescue courses, technical rock rescue, ice and crevasse rescue, rope handling skills.

American Mountain Guides Association (AMGA)

Box 2128, Estes Park, CO 80571. (303) 586-0571. The Rock Guides Rescue Course.

International Alpine School

P.O. Box 3037, Eldorado Springs, CO 80025. (303 494-4904. Mountain rescue, rock rescue, ice climbing rescue, avalanche protocols, offered area-specific.

Troll

P.O. Box 606, Laramie, WY 82070. (307) 745-5893. High angle rescue from basic to instructor level, plus industrial access rescue.

Cave Rescue

National Speleological Society (NSS). 2813 Cave Avenue, Huntsville, AL 35810. (205) 852-1300. Several levels of cave rescue training.

River Rescue

American Canoe Association (ACA)

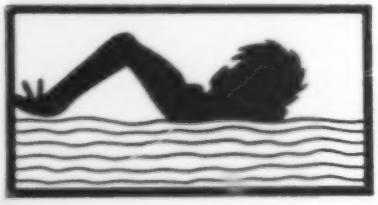
8580 Cinderbed Road, Suite 1900, P.O. Box 1190, Newington, VA 22122-1190. (703) 451-0141. River rescue programs, and referral to other river rescue training.

Nantahala Outdoor Center (NOC)

U.S. 19 W Box 41, Bryson City, NC 28713. (704) 488-6737. Swift Water Rescue Technician course with standard certification, plus personal boater rescue courses.

Rescue Three International

P.O. Box 519, Elk Grove, CA 95759. (800) 457-3728. Several levels of technical river rescue training.



SCUBA Rescue

Catalina Hyperbarics

P.O. Box 398, Two Harbors, CA 90704. (213) 743-6793. Two levels of SCUBA rescue training.

Dive Rescue

201 Northlink Lane, Fort Collins, CO 80524. (303) 482-0887. Comprehensive SCUBA rescue instruction for everything from river rescue to ice-diving.

Life Guard Systems

P.O. Box 548, Hurley, NY 12443. Very intensive and comprehensive SCUBA rescue instruction program.

National Association of Underwater Instructors (NAUI)

P.O. Box 14650, Montclair, CA 91763. (714) 621-6405. SCUBA rescue instruction.

Professional Association of Diving Instructors (PADI)

1251 East Eyer Road #100, Santa Ana, CA 92705-5605. (800) 729-7234. Many rescue certifications at all different levels, plus referral to nearest PADI instruction.

SCUBA Schools International (SSI)

2619 Canton Court, Fort Collins, CO 80525. (800) 821-4319. SCUBA rescue instruction at several levels, including diver level and leadership level.

1993 SOLO Courses

Wilderness First Responder

Dates & Locations:
- May 8 to 18: Wolfcreek, Georgia
- June, Dates TBA: Hulbert, Vermont
- July, Dates TBA: Mariner FR, UNE, ME

Hours: 80 +

Cost: $675*

Wilderness EMT

Dates & Locations:
- May 17 to June 11: SOLO
- June 21 to July 23: With ALEC at SOLO
- July 26 to August 20: SOLO

Hours: 160 +

Cost: $1,325*

Wilderness First Aid/WFR Recert

Dates & Locations:
- May 1 & 2: AMC, New Hampshire
- May 15 & 16: SOLO
- June 14 to 16: With CPR at SOLO
- June, Dates TBA: With CPR at Hulbert, Vermont

Costs: $75.00 to $150.00 depending on room and boarding options

Rope Rescue Courses

High Angle Rescue
- June 12 & 13 at SOLO - $145.00 (w/lodging & 4 meals)

Advanced High Angle Rescue
- June 19 & 20 at SOLO- $160.00 (w/lodging & 4 meals)

Ropes Rescue
- June 25 to 29 at SOLO: $495.00 (w/lodging & all meals)

Residential courses include lodging, meals, all instructional materials, textbooks, and examination and certification fees. *Costs may vary for courses at sites other than SOLO. For more information, contact: SOLO, RFD 1, Box 163, Tasker Hill, Conway, New Hampshire 03818. Or call: (603) 447-6711.

WMN Dispatches

Plague in the Southwest

When a Tucson man rescued a friend's cat in rural Colorado last summer, he had no idea he was signing his own death certificate. Unfortunately, the cat, which was lying in a crawl space, was suffering from the bubonic plague. The cat sneezed in the man's face and, apparently, infected him. Within three days the man had a high fever, nausea, and stomach cramps. He went to the hospital two days later but it was too late: he did not recover.

The CDC says that bubonic plague is prevalent in rodents in the Four Corners area of the Southwest, in western Nevada, and the Pacific Coast of northern California and Oregon. It is spread through the bite of infected fleas. Dogs seem to be immune to the plague but can carry the fleas, so treat them with insecticide to keep fleas at bay. Outside cats that like to hunt are susceptible. If you notice your cat being abnormally reclusive, drooling, or developing swelling or sores in its mouth or jaw, get it to the vet. And, don't let it breathe in your face.

Cold is Not Necessarily Dead

A hypothermic, 68-year-old, Seattle woman was placed in a body bag after having been declared dead by an EMT and the medical examiner. The error was not discovered until a mortuary worker zipped open the bag, only to find her breathing. The woman was suffering from terminal cancer and really died, in a hospital, the next day. A fire department spokesperson said, "Her body was extremely cold, her pupils were fixed and dilated, and they couldn't find a pulse. Apparently, her body temperature went up in the body bag, and she began breathing."

Remember to assess those hypothermia victims carefully. Very carefully.

CPR Training and HIV Update

Students in CPR classes are often concerned about contracting AIDS from a mannequin. So far, there have been no cases of HIV having been transmitted via CPR training. However, because the virus is found in saliva and can survive for a short time on plastic, the question has been investigated by researchers. They found that even sloppy cleaning is enough to prevent the spread of the virus that causes AIDS. Five to 10 seconds with 70 percent isopropyl alcohol seems to do the trick, as will wiping with a clean dry cloth.

Other diseases, including herpes, are more resilient and have been transmitted during the training or performance of CPR. For a copy of the report "Decontamination of an HIV-contaminated CPR manikin" (Am. Journal of Public Health, 82:1542-1543, 1992.) write to Inge B. Corless. CB #7460 Carrington Hall, University of North Carolina, Chapel Hill, NC 27599-7460.

Biking: Heady Stuff

The January/February issue of Health magazine provides the following statistics. Number of children who will receive a bicycle as a gift this year = 2,000,000. Number who will also receive a helmet = 100,000. Number of children treated in emergency rooms each year for bicycle-related head injuries = 50,000.

Freezing Drugs

We've had several questions recently about the effect of cold on various drugs and medications. So, here are a few general recommendations, which come from the Navy, for backcountry users and rescue personnel:

Most drugs freeze at temperatures well below 32 degrees F. Those that do freeze are, in most cases, alright as long as the container has not been damaged, a factor which may effect sterility.

Any solution that has been frozen should be shaken well to resolubilize any crystals that may have formed.

Bags of IV solutions (Ringer's, saline, dextrose) can be used after freezing if no visible precipitates are present and the bags are intact.

Information on specific drugs:

- Epinephrine 1:1000 (found in Ana-kits) is OK after freezing.
- Povidone iodine solution (Betadine) is OK after freezing.
- Hydrogen peroxide is altered after freezing and should not be used.

- Milk of Magnesia is altered after freezing and may be unsafe.
- Decadron is known to be unsafe after freezing.
- Most ointments and lotions are known to be altered and are probably unsafe after freezing.

For more information consult Tek D, Boehm RK, and Craven A (eds.): **Handbook for Medical Operations in the Cold**. Fourth Marine Expeditionary Brigade Publication, Norfolk, VA 1989.

Medicine For Adventure Travel

A small group of highly experienced travel and wilderness medicine experts have joined together to create a course entitled "Medicine for Adventure Travel." The course is designed to impart expertise in advising and treating those travelers who choose to go to remote and exciting destinations. The curriculum includes advice on travel medicine (immunizations, chemoprophylaxis, infectious diseases, first aid kits), and the special concerns of the extreme environments (altitude illness, frostbite, trauma, evacuation).

The course will be of use to medical practitioners who advise and treat travelers, and to those practitioners who travel themselves, serving as "trip doctors," or "expedition doctors." The faculty includes David Shlim, Peter Hackett, Lanny Johnson, and others. The course takes place in Jackson, WY from July 11 to 16, 1993. For more information call Nancy Johnsen at St. John's Hospital (307) 739-7563.

Wilderness Medicine and Rescue Training in Western Pennsylvania

The ASRC-CEM Wilderness Emergency Medicine Curriculum Development Project is producing a Wilderness EMT Curriculum and textbook; the Curriculum is partly complete, and completed Lesson Plans are available for the cost of copying and mailing. Order forms and WEMT information are available from: Attn: George C. Pry. EMT, Center for Emergency Medicine of Western Pennsylvania, 230 McKee Place, Suite 500, Pittsburgh, PA 15213-4904; (412) 578-3180. These Lesson Plans may be used locally for WEMT continuing education.

The Appalachian Search and Rescue Conference and Center for Emergency Medicine of Western Pennsylvania also offer WEMT Module classes twice a year. Prerequisites are EMT and search and rescue training. Classes are based on the Curriculum, and are held in the western Pennsylvania mountains. For convenience of local volunteers, the classes are spaced over one two-day weekend (WEMT I) and one three-day weekend (WEMT II), but plans are being made to offer a week-long class in 1994 for those outside the region. The ASRC's local Allegheny Mountain Rescue Group also offer a Basic Wilderness Rescue class for those needing it to meet the SAR prerequisite. Cost includes food except for field rations, lodging, and the text. 1993 dates:

- BWR: $100 - March 13-14, October 23-24
- WEMT I: $100 - March 27-28,November 6-7
- WEMT II: $125 - April 23-25, November 19-21

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The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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Wilderness Medicine Institute

P.O. Box 9
Pitkin, Colorado 81241
Telephone: (303) 641-3572
Answering Service: (303) 641-4766

Here Are Some of WMI's 1993 Offerings:

Wilderness EMT

May 17 to June 11 in Pitkin, Colorado
- Cost: $1,295.00

August 2 to 27 in Pitkin, Colorado
- Cost: $1,295.00

November 22 to December 16 in Kelly, Wyoming
- Cost: $1,350.00

Wilderness First Aid

This course may be used as a WFR refresher.

May 11 to 13 in Salt Lake City, Utah
- Cost: $110.00

May 24 to 26 in Creede, Colorado
- Cost: $110.00

May 31 to June 2 in Buena Vista, Colorado
- Cost: $110.00

Subscription Information: Wilderness Medicine Newsletter Order Form

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

May/June 1993 Volume 4, Number 3

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Diving Emergencies

by Buck Tilton

SCUBA (self-contained underwater breathing apparatus) diving has markedly increased in popularity in the last three decades, with over 6 million people having been trained and certified by U.S. SCUBA diving agencies since 1960. There are now estimated to be about 3 million active recreational SCUBA divers in the U.S., and more than 300,00 new sport divers are trained each year.

SCUBA diving is a very safe activity for persons who are healthy, well-trained, well-equipped, and well-adjusted underwater. However, it does have some inherent risks. A look at all of the potential problems affecting divers would take enough paper to fill the Dead Sea, so let's focus here on the several pressure-related syndromes that are relatively common, unique to diving, and known collectively as dysbarism.

Physical Principles of Diving

Human beings are poorly adapted for functioning in the aquatic environment, and SCUBA divers encounter many adverse physical conditions when submerged.

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Diving Emergencies

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These include cold, wetness, the absence of air to breathe, increased density of the ambient environment, altered sound and light conduction, and increased atmospheric pressure.

Of the various physical conditions characteristic of the underwater environment, increased atmospheric pressure is by far the most important. Increased pressure and rapid changes in pressure account, either directly or indirectly, for the majority of serous diving medical emergencies. When a SCUBA diver goes underwater the ambient pressure increases because of the weight of the water. Since water is much more dense than air, pressure changes underwater are substantial even for small fluctuations in depth.

Pressure is defined as force per unit area, and can be measured in a number of ways. Feet of sea water (fsw) and atmospheres absolute (ATA) are commonly used. At a depth of only 33 fsw, the pressure is 2 ATA, or twice the pressure at sea level (compare this with the fact that mountaineers must ascend to 18,000 feet to reach 1/2 the pressure as at sea level). At 165 fsw it is 6 ATA. The greatest pressure-related change occurs near the surface. This is the reason that the majority of problems occur at shallow depths.

Since body tissues consist mostly of water, which is not compressible, they are not significantly affected by the changes in pressure that occur at depths where most diving is done (generally less than 100 fsw). However, gases are compressible, so the gas-filled spaces of the body are directly affected by changes in ambient pressure.

Gas Laws

Knowledge of three gas laws is fundamental to understanding pressure-related diving medical emergencies.

Boyle's law states that the volume and pressure of a gas are inversely related to its pressure at a constant temperature. In other words, when the pressure on a gas increases the volume decreases, and the converse is true. This law explains the basic mechanism of all types of barotrauma.

Dalton's law states that the pressure exerted by each of the individual gases in a mixture of gases is the same as it would exert if it alone occupied the same volume. Alternatively, this law states that the total pressure of a mixture of gases is equal to the sum of the partial pressures of the component gases. Since the biologic effects of a gas depend on partial pressure, Dalton's law is fundamental to the pathophysiology of decompression sickness.

Henry's law states that the amount of gas dissolved in a fluid is proportional to the pressure of the gas in which it is in equilibrium. This law explains why more inert gas (e.g. nitrogen) dissolves in a diver's body during descent and, conversely, is released from tissue with ascent from depth.

Barotrauma

Air pressure within the middle ear, sinuses, lungs, and other gas-filled spaces of the body is normally in equilibrium with the environment. If something obstructs the free passage of air into and out of these spaces, then a pressure disequilibrium will develop. If the gas-filled space cannot expand or contract to accommodate the pressure-related change in gas volume, then tissue injury will occur. Such injuries are collectively referred to as barotrauma. Overall, barotrauma is the most common affliction of SCUBA divers. For purposes of discussion, barotrauma can be categorized according to whether it occurs during descent or ascent.

Barotrauma of Descent

Barotrauma of descent or "*squeeze*", as it is known in diver's parlance, results from the compression of gas in enclosed spaces as ambient pressure increases with descent underwater. The ears and nasal sinuses are most often affected. More than one type of barotrauma may be present at the same time.

Ear barotrauma affects essentially all divers at one time or another and is the most frequent type of barotrauma. Although the external ear can be affected, this is unusual.

Much more common is middle ear squeeze, or **barotitis media** which results when the diver fails to equalize pressure in the middle ear because of closure or dysfunction of the eustachian tube. Divers usually notice a sense of fullness, followed by increasingly severe pain. Blood may leak from the ear, and the tympanic membrane may rupture, resulting in tinnitus or hearing loss, depending on the severity of the injury.

The treatment from uncomplicated middle ear squeeze is abstinence from diving or other pressure exposure until the condition has resolved, and the use of oral decongestants (e.g. pseudoephrine) to shrink swollen mucus membranes and help open up the eustachian tube. A combination of an oral decongestant and a long-lasting nasal spray, at least for the first two or three days, is usually most effective. Analgesics (painkillers) should be given as needed.

Although less common, inner ear barotrauma is much more serious than middle ear barotrauma because of possible permanent disabling injury. Inner ear barotrauma typically results from the sudden or rapid development of markedly different pressures between the middle and inner ear, such as may occur from an overly forceful Valsalva maneuver intended to equalize the pressure in the middle ear, or an exceptionally rapid descent during which the middle ear pressure is not equalized.

The classic triad of symptoms indicating inner ear barotrauma is roaring tinnitus, vertigo, and deafness. A feeling of fullness or "blockage" of the affected ear, nausea, vomiting, pallor, sweating, disorientation, or loss of coordination may be present. The onset of these symptoms may occur soon after the injury or may be delayed several hours, depending on the specific type of inner ear injury and the diver's activities during and after the dive. The essential point, however, is that any SCUBA diver with a hearing loss should be considered to have inner ear barotrauma until shown otherwise, and should be seen by a physician as soon as possible.

Just as with the ears, the nasal sinuses may also fail to equalize pressure during descent, thus resulting in sinus squeeze. The frontal and maxillary sinuses are most often affected.

Sinus squeeze usually causes pain in the affected sinus, and the diver may notice bleeding from the mouth or the nose. Examination may be unremarkable or may elicit tenderness to percussion over the affected sinus. Treatment for sinus squeeze is similar to that for middle ear squeeze and consists of the use of decongestants, analgesics, and abstinence from diving until the condition is resolved. Antibiotics are usually indicated in cases of frontal sinus squeeze because of concerns about complications resulting from frontal sinusitis. Consult a physician.

"A Look at all of the potential problems affecting divers would take enough paper to fill the dead sea."

Signs and Symptoms of Ear/Sinus Barotrauma:

- Pain in the affected area
- Bloody or unusual fluid leaking from the ear, nose, or mouth
- Vertigo (dizziness)
- Nausea
- Disorientation
- Tinnitus or hearing loss

Barotrauma of Ascent

Although it is much less common than squeezes, SCUBA divers may also suffer barotrauma of ascent, which is the reverse process of what happens in the squeeze syndromes. The only type of barotrauma of ascent that occurs with any real frequency is the **pulmonary overpressurization syndrome** (POPS).

The POPS, a dramatic demonstration of Boyle's law, results from the expansion of entrapped air in the lungs. Air entrapment usually occurs because of breath-holding during ascent (e.g. because of running out of air at depth or because of panic). The net effect leads to alveolar rupture and air filling extra-alveolar locations. The POPS usually presents with gradually increasing substernal chest pain, difficulty breathing, and difficulty swallowing. Subcutaneous emphysema may be present.

The treatment usually consists only of observation and abstinence from further diving for four to six weeks after the condition has resolved. In severe cases, hospitalization may be necessary. Administration of supplemental oxygen may hasten resolution of the condition. An important point, except in exceedingly rare situations, is that recompression is contraindicated because of the fear of causing further pulmonary barotrauma. Pneumothorax is an infrequent manifesta-

(continued on page 4)

Diving Emergencies

(continued from page 4)

tion of the POPS and is treated as when it occurs in other situations.

Air Embolism

The most serious complication of pulmonary barotrauma and, indeed, the most dramatic and serious medical emergency associated with SCUBA diving is **dysbaric air embolism** (DAE). Next to drowning, cerebral air embolism is the leading cause of death in sport divers and accounts for 25% to 30% of recreational diving fatalities and for about 35% of the patients treated at active diving accident treatment centers in the United States.

Dysbaric air embolism typically presents immediately on surfacing from a dive, at which time the diver exhales and relieves the high intrapulmonic pressure that has resulted from lung overexpansion; this allows bubble-laden pulmonary venous blood to return to the left side of the heart.

Manifestations of DAE are myriad, but they tend to be dramatic, the brain being affected most often. Loss of consciousness, convulsions, blindness or other visual disturbances, inability to speak, confusion, vertigo, headache, weakness, and various sensory disturbances are the most common manifestations. Sudden loss of consciousness in a SCUBA diver immediately on surfacing should always be considered to be attributable to cerebral air embolism until proven otherwise.

All patients suspected of suffering an air embolism must be referred for recompression (i.e. hyperbaric oxygen treatment) as rapidly as possible. This is the primary and essential treatment.

As soon as possible, all DAE patients should be given high-flow supplemental oxygen.

"The majority of DAE patients have definite signs and symptoms of neurologic injury when first evaluated."

The majority of DAE patients have definite signs and symptoms of neurologic injury when first evaluated. However, a significant number manifest spontaneous recovery, at least initially. Nonetheless, they must still be transported for recompression treatment because it is impossible to fully exclude impairment, and many of these patients deteriorate over the ensuing hours, often to a worse condition than originally.

In contrast to previous recommendations, it is now recommended that in the field and during transport, patients should be maintained supine. Placement in the left-side/head-down position is no longer recommended because of the uncertain benefit of such a maneuver, concerns about causing or aggravating cerebral edema (especially if left in the head-down position for longer than 30 to 60 minutes), and increased respiratory difficulty associated with being in such a position.

Decompression Sickness

Decompression sickness (DCS), or, as it is more often called, the bends, is a multi-system disorder that develops when atmospheric pressure is decreased, thus causing the liberation of inert gas (nitrogen in dives using compressed air) from solution and consequently, the formation of bubbles in blood and other tissues. Bubbles cause mechanical effects, such as blockages in blood vessels. The overall effect is to decrease tissue perfusion.

The manifestations of DCS are many, with the musculoskeletal system and central nervous system being most often affected. Joint pain is the single most common symptom of DCS and occurs in about three-fourths of the patients. In SCUBA divers the joints most often affected are the shoulders and elbows, although any joint may be affected. The pain is usually described as dull and is usually located deep in the joint. Movement of the joint worsens the pain.

Neurologic manifestations of DCS are less common. Because of the random manner in which bubbles may affect the central nervous system, essentially any symptom is compatible with neurologic DCS. Nonetheless the lower thoracic, lumbar, and sacral portions of the spinal cord are most often affected, and consequently paraplegia or paraparesis, lower extremity paresthesia, and bladder or bowel dysfunction are the most common symptoms of neurologic DCS. However, after a dive, anyone who manifests symptoms which cannot adequately be explained by other conditions should be presumed to have DCS until proven otherwise. Such a patient should be transported for recompression treatment without delay.

All patients suspected of having DCS should be started on high-flow supplemental oxygen as soon as possible, and other life support measures should be given according to the patient's specific condition.

In both DAE and DCS, patients should be transported to the recompression chamber in the most expeditious manner possible. In some cases this means aeromedical evacuation. In such situations the patient should be subjected to the least possible pressure reduction so as not to cause further bubble formation or expansion of existing bubbles. Depending on the specific circumstances (e.g. weather, geography, transport distance, available aircraft), either helicopters or fixed-wing aircraft may be used if they can be safely flown at less than a 1000-foot altitude.

Nitrogen Narcosis: Rapture of the Deep

Several diving-related problems may develop as a result of breathing gases at a higher than normal atmospheric pressure. Among these is nitrogen narcosis, a result of the anesthetic effect of nitrogen at elevated partial pressures. There is considerable variability in susceptibility to nitrogen narcosis, with the symptoms usually becoming evident between 70 and 90 fsw. At depths of 200 fsw, divers are usually so impaired that they can do little or no useful work. Loss of consciousness begins to occur at depths greater than 300 fsw.

Nitrogen narcosis is a reversible condition that has manifestations similar to alcohol intoxication, including impaired judgment, giddiness, poor concentration, incoordination, and slowed motor response. Nitrogen narcosis completely resolves with ascent to shallower depths, and divers often do not notice or recall these adverse effects.

Nitrogen narcosis is important mainly because of its ability to impair a diver's judgment and memory, thereby possibly precipitating and accident. This possible confounding factor always must be considered when taking a diving accident history, especially when there is a history of diving deeper than 100 fsw.

Emergency Diving Medicine Consultation Resources

- Divers Alert Network (DAN), Durham, NC, 24-hour Medical Emergency Hotline, (919) 684-8111, Non-Emergency Advisory Line (919) 684-4544.
- U.S. Navy Experimental Diving Unit, Panama City, FL, Emergency Consultations, (904) 234-4351.
- U.S. Naval Medical Research Institute, Bethesda, MD, Emergency Consultations, (301) 295-1839.**

Wilderness-Related Medical Conferences

Seventh Annual Sports Medicine: A Practical Approach for the Primary Care Physican

July 26 - 30, 1993

At the San Diego Princess, California

For physicians and those in allied health fields, this conference promises up-to-date information as well as hands-on sesssions.

For more information: Universtiy of California, San Diego, Office of Continuing Medical Education, 0617, 9500 Gillman Drive, La Holla CA 92093-0617. (619) 534-3940, FAX (619) 534-7672.

Wilderness Medicine: '93

July 28 - August 1, 1993

At Squaw Valley, Lake Tahoe, California

Lots of exciting hands on practice at various field stations; first rate faculty.

For more information: call (800) 888-5632, or (503) 488-3843

Wilderness Medical Society: Ninth Annual Scientific Meeting

August 8 - 13, 1993

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SUICIDE

By Ken Thompson

The trip leader knew that John had really been feeling down since the beginning of the trip. His depression was understandable: he had just finished a rough first year at college and had found himself on academic probation. His parents, who were willing to try anything to get him to succeed in school, had paid for this wilderness venture in the hope he would find new energy and get his life back on track. That plan did not seem to be working: John was as disinterested in the trip as he had been in school and was distracted to the point that he was having trouble sleeping. Finally, during a camp fire discussion, it emerged that John's best friend at school, Martin, had committed suicide just six months ago. John tended to dwell on the hopelessness of his present situation and often spoke of how things were so much better for Martin--no hassles, no more crap from the system, no demands from over-bearing parents.

Cries for help jolted everyone awake. John's tentmate had shaken off heavy sleep and had found John's suicide note. In a groggy haze he had shouted for help. John was found a short distance from camp, huddled in a fetal position, tear-stained and quaking, small scratches from a pocket-knife criss-crossed his wrists. Very little blood had been shed, and the cuts were patched up with a few band-aids. Finding help from no other source, John had gone through all the motions, but, fortunately, had not committed entirely to his plan.

Treating patients in an emergency setting is fairly straightforward when the problem is obvious (i.e. a broken arm gets splinted, the hypothermic patient gets warmed up, the heat stroke victim gets cooled down). Treatment gets more complex when the diagnosis is difficult (non-specific abdominal pain, tingling toes, or a strange itching rash that has completely engulfed someone's left foot). But problems of psychological origin constitute the most frustrating you will ever face. You have no clues except what the patient reveals, and by definition of the ailment, your patient will mask those clues.

The Emergency Medical Services Act of 1973 included behavioral emergencies as one of seven, disease-specific categories which EMS providers are expected to manage. However, because determining the proper care for such patients is often subjective, intuitive, and based on years of clinical judgment, the EMS provider can be provided with only the most general of guidelines. According to one well-respected EMT text, "There is probably no other area of medicine where the need for careful judgment and experience is more valuable or where there is greater danger of displaying an inappropriate bias or reacting negatively to patients." (from Henry and Stapleton's EMT: Prehospital Care, W.B. Saunders Company, 1992, p. 680.).

Assessing a threat of suicide

Fortunately, well-informed, aware trip leaders may detect enough clues to prevent traumatic, actual or feigned attempts at suicide. Specifically, we can look for groups or patterns of behaviors which are often called a "constellation of signs". This particular list of signs is taken from the North Carolina Outward Bound School's Instructor's Handbook and is particularly relevant for those who work in wilderness environments:

- Change in eating or sleeping patterns
- Depressed, melancholy, hopeless, helpless
- Violent, rebellious, angry, fire-setting, agitated depression
- Withdrawal
- Runs away
- Persistent boredom or lack of pleasure in activities
- Substance abuse (including tobacco)
- Decline in commitment or effort
- Decline in personal appearance
- Personality change
- Physical complaints, psychosomatic problems, intentional accidents
- Preoccupation with death
- Giving away possessions or will-making
- Recent suicide of acquaintance or significant other
- History of suicide in the family
- Expression of suicidal thoughts (including jokes)
- Threat of violence to others
- History of suicide attempts or suicide ideation
- Rapid improvement in morale (especially with no apparent reason)

A person exhibiting any one of the behaviors from the above list is not necessarily in danger of hurting him or herself. But when a combination of them appear in the same individual, red flags should go up in the eyes of the knowledgable trip leader.

The best approach is to straightforwardly ask the question, "Are you thinking of hurting or killing your-

self?" If the answer is yes, you should follow these guidelines:

1. **Respect the patient's personal space.** If a suicide attempt is not imminent, and the person is calm, you're best response is to gain his or her trust. As frightening as the situation may be for you, encourage conversation. Be curious and concerned.

2. **Establish an empathetic, attentive attitude.** Resist the temptation to try to talk the patient out of anything. Listen, withold judgment, and try to reflect back to the person what he or she is saying. Example, "You feel that there is just no hope for your life getting any better, and you would rather end things than go on with the emotional pain you're feeling." Statements like this (be as specific as possible when you describe emotions and situations) communicate to the patient that you understand or, at least, are attempting to understand. The typical suicidal patient feels alienated from the rest of society; your overature may form the critical link that keeps him or her going.

3. **Assess the seriousness of the threat or the "level of lethality".** Gather as much information as you can on the following topics by interviewing the patient:

- **Plan:** Do you have a plan? If so, what is it? When? Have you written or do you intend to write a suicide note? (The presence of a plan is the single most important question. The risk of a successful attempt increases with the specificity and detail of the plan, and when the chosen method is readily available and violent.)
- **Level of Control:** Are you currently using alcohol or recreational drugs? Are you taking any medications? (Assess how much impulse control the person seems to have; how rational he or she seems to be; and whether or not words and actions are congruent.)
- **History:** Have you ever attempted suicide before? Have you ever been treated by a psychologist or psychiatrist? If so, for what? How would you assess the level of stress you are currently feeling compared to other times in your life? Does anyone in your family have a mental illness or has anyone in your family attempted suicide?

Document this information.

4. **Reduce the immediate stress by altering trip plans to deal exclusively with this person's difficulty.**

5. **"Contract" with the person that he or she will not attempt suicide for 24 hours (or a shorter or longer period, depending on what seems appropriate).** Then, renew the contract as needed. Negotiating short, measured periods of time can be helpful to the suicidal person, who is often overwhelmed by the enormity of dealing with an entire lifetime. Check in with him or her regularly. If the situation seems threatening enough, staff should supervise the person 24 hours a day.

6. All of the steps listed above are temporary measures designed to get your patient out of the backcountry and into the hands of someone with specific training. If your program has a staff psychologist or psychiatrist, call at the first opportunity for further advice. Be prepared to pass along the information you've collected as you would any other medical report. If you do not have access to other professional help, and the situation is volatile, you can find help at the nearest hospital emergency room. The staff will have access to people trained in suicide intervention.

Handling an actual attempt

If you find yourself dealing with someone who has gone beyond the contemplation of suicide and has made or is making an attempt, decisive action is required. First, initiate the same attempts at forming a trusting relationship as outlined in numbers 1 and 2 above. Keep the person engaged in conversation and try to distract him or her from the act itself. Second, do what you can to protect the patient from his or her self. Remove any harmful objects from the scene. Without placing yourself in danger, position yourself to respond physically to his or her self-directed act of violence. This should be for your protection first (get out of the line of fire) and for the patient's second (can you safely drag him or her away from the cliff?). Third, monitor the scene constantly; do not leave the person alone. Fourth, if you do gain control of the situation, provide any medical attention necessary, and, maintaining a trustful bond with the patient to the extent possible, get him or her to professional care as soon as possible. If you need extra help, enlist the aid of a peace officer, who may legally restrain someone and has the training and equipment to do so.

Conclusion

Be aware that your actions may not be successful. Recognize that the enigma of suicide baffles even those who understand human behavior the best. The suicide of someone you know or someone who is in your charge can be emotionally devastating. Guilt is almost inevitable among those left behind. Anticipate this and understand that it is a natural feeling. Seek help from those around you and engage in thoughtful debriefings with professional assistance. ••

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Marine First Aid Kits

Water, water, everywhere . . . so you better make sure your first aid supplies are water-proof. That means carefully packaging the items within the kit, or carefully packaging the entire contents in a waterproof container.

Phil Carey, part-owner and president of Atwater Carey, Ltd., announces the availability of a new addition to the company's line of waterproof kits. ACL's Marine First Aid Kit comes in an indestructible 15" x 18" x 6" Pelican case and represents the maximum in waterborne first aid supplies. Contents are organized for quick grabs of needed items. An extensive array of wound management material includes Tegaderm, Second-Skin, Bloodstoppers, Steri-Strips, and everything from sterile gauze pads to knuckle bandages. The equipment list starts with stethoscope and sphygmomanometer and runs through SAM splint and Sawyer Extractor to thermometer and forceps. In the medications section you'll find treatments for pain, upset stomach, nasal congestion, plus a plethora of stuff to help you with things like wound cleaning, sunburn, hand-washing, and itching . . . and that's not all.

This massive kit caries a suggested retail price of 456.95. WMN subscribers qualify for a discount on the Marine First Aid Kit and all ACL outdoor first aid supplies and kits. If the Marine Kit is overkill for you, ACL offers the small Kayaker, intermediate Water Rescue, and large Whitewater in Pelican cases. As an alternate to the hardshell cases, you can opt for the Wilderness Canoe enclosed in soft, watertight Voyageur drybag. Ask for Phil at (800) 359-1646, Atwater Carey, Ltd., 218 Gold Run Road, Boulder, CO 80302. **

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Chinook Medical Gear, Medical Necessities for the Outdoors and Travel, has a new 68-page catalog ready to be sent your way . . . the convenience of bying top quality merchandise under one roof from the comfort of your home . . . personalized service . . . product knowledge and expertise. Write or call for the new catalog from Chinook Medial Gear, 2805 Wilderness Place, Suite 700 Boulder, CO 80301. (800) 766-1365.

Wilderness Medicine Courses

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NEW! Wilderness EMT Bridge Course

- October 11 - 22 at SOLO
- Cost: $695
- This course is just the ticket if you've completed a WFR within the past year and would like to upgrade your certification to Wilderness EMT.

Wilderness First Responder

- July 5 - 16 (Mariner First Responder) University of New England, Maine
- Cost: Approximately $675

Costs for the following courses will vary:

- August 23 - September 3 at Dartmouth
- September 10 - 19 at SOLO
- October (exact dates TBA) at Wolfcreek, Georgia
- October 25 - November 5 at the AMC, Pinkham Notch, New Hampshire
- December 10 - 20 at the Hulbert Outdoor Center, Vermont

Wilderness EMT

- July 26 - August 20 at SOLO
- September 20 - October 15 at SOLO
- Cost: Approximately $1325

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P.O. Box 9
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Wilderness EMT

August 2 to 27 in Pitkin, Colorado
November 22 to December 16 in Kelly, Wyoming

- Cost: $1,350.00

Wilderness First Responder

September 4 to 13 in Flathead Lake, Montana
October 25 - November 5 in Jackson, Wyoming

- Cost: Approximately $425

Fall Classic Deluxe Wilderness First Responder

September 25 to October 4 at the Selway Lodge in the Selway Bitteroot Wilderness

- Cost: $750.00 (includes deluxe accommodations and meals) + airfare + tax

Wilderness and Rural EMT Module

October 28 to November 9 in Boulder, Colorado

New OTC Analgesic on the Horizon

Only three analgesics (painkillers)--aspirin, acetaminophen, and ibuprofen--are currently available without a prescription, but a fourth (naproxen) will probably go over-the-counter (OTC) before the end of 1993. Each of these drugs has strengths and weaknesses, and some seem to work better for some people than for others:

- For bone and muscle pain, ibuprofen and naproxen work best.
- For headache, any of the four will usually work.
- For inflammatory pain, such as tendinitis or arthritis, acetaminophen has little or no effect.
- For pain of burns, including sunburn and frostbite, ibuprofen usually works best.
- Gastrointestinal irritation occurs, for some people, with aspirin, ibuprofen, and naproxen, especially if taken on an empty stomach (people with ulcers should avoid these three).
- People with liver problems should avoid acetaminophen.
- People with asthma should generally use acetaminophen. The other three may cause an increase in breathing difficulty. If in doubt, ask your doctor.

The American Society of Hospital Pharmacists (In AHFS Drug Information, 1992: 1041 - 1130) recommends the following adult dosages for OTC analgesics:

aspirin: 325 mg to 650 mg every 4 to 6 hours

acetaminophen: 325 mg to 650 mg every 6 to 8 hours

ibuprofen: 200 mg to 800 mg every 6 to 8 hours

naproxen: 255 mg to 555 mg every 6 to 12 hours

Children, in general, should not be given drugs, especially aspirin, which may produce a fatal reaction, without a doctor's advice.

A wilderness emergency care provider going well beyond easy reach of a hospital should consider asking a physician for a prescription-strength painkiller for severe pain, something from the opiate family, that blocks the brain's ability to feel. Some of the commonly carried medications of this type are Tylenol #3, Vicodin, and Percocet. These stronger drugs must be carried with explicit instructions as to their use.

Remember that all painkilling drugs mask the symptoms but do not treat the cause of the pain. Persistent symptoms are a clear indication that it's time to consult a physician. **

Urinary Tract Infection

Ms. E., an active 78-year-old, complained to her Elderhostel instructor of abdominal pain. On closer questioning, B., the instructor, discovered the pain was low, just above the public bone. Further investigation disclosed complaints of a burning sensation during urination and tenderness at the costovertebral angle, or CVA (where the "floating ribs" meet the backbone). Ms. E. stated the pain had been bothering her for "several days" and that her urine had been smelling "most foul." The patient had an oral temperature of 100 degrees F (37.7 degrees C). B. suspected urinary tract infection (UTI), and she was correct.

UTI affects females (of all ages) far more often than males, due to the relatively short length of the female urethra. Infection may involve the urethra, the bladder and the ureters.

Signs and symptoms include:

- increased frequency of urination
- urgency of urination,
- and/or a burning sensation during urination.

Heavy urine odor (especially in the morning) and pain just above the pubic bone are common. Blood and/or pus may be present in the urine. UTI can progress to kidney infection. If the kidneys are infected, the patient usually complains of rebound tenderness in the small of the back (CVA) and may have a fever.

Treatment should start immediately and should include drinking lots of water every day, which causes the bladder to empty more often, which helps rid the body of the infection. Urine, for all people, should run clear - unless the individual is taking vitamins, which may turn urine a yellowish color. The perineal area should be cleaned with water and, if possible, mild soap daily. Taking 500 mg (or more) of vitamin C and/or eating whole grains, nuts and fruits may make the urine more acidic, which prevents bacteria from growing. White flour, rice or pastas and refined sugars, on the other hand, may predispose a person to bladder infections. Curry, cayenne pepper, chili powder, black pepper, caffeine and alcohol should be avoided because these irritate the bladder. Vitamin B6 and magnesium or calcium supplements will help relieve spasms of the urethra.

On extended expeditions, consider carrying antibiotics to treat UTI. The most commonly prescribed antibiotic for UTI is Bactrim (sulfamethoxazole and trimethoprim). Other brands of this antibiotic include Septra, Cotrim, and Sulfatrim. If an infection persists for more than 48 hours despite the use of antibiotics, the patient should be evacuated. **

Letters to the Editor

Peroxide Uses

A Reader Asks:

"Is hydrogen peroxide something I should be carrying in my first aid kit? I read recently that it can even be taken orally."

- D., Gunnison, CO.

As an oral medication, hydrogen peroxide (H202) has no known therapeutic value for any ailment and, in fact, can be dangerous. It is a highly corrosive chemical that can burn the esophagus, cause nausea and vomiting, and, undiluted, even death.

Recently, H202 has been extolled as an aid in the treatment of arthritis, with a recommended strength of 35 percent concentration, which is 10 times stronger than the solution sold for wound cleaning. Some books have recommended soaking arthritic joints in a hydrogen peroxide solution. It won't harm you if used that way, but, unless the water is warm, it won't make the joint feel any better, and the H202 does not help. Hydrogen peroxide enemas and injections have been suggested, but both can damage tissue, both should be considered very dangerous, and both should be avoided.

As a wound cleaner, H202 is approximately a 3 percent concentration. No proof exists that it cleans wounds any better than a good washing with soap and water. It does not "bubble out" infectious agents or dirt from puncture wounds. There is a mild antimicrobial action to the bubbling of hydrogen peroxide, but, as mentioned, soap and water work just as well...or even better if you are meticulous about wound washing.

Here, in conclusion, is a quote from the Wellness Letter, March 1993: "We don't recommend H202 for any home use. There's no reason to keep it in your medicine cabinet at all." Or, we might add, in your wilderness first aid kit. **

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The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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And Still Another Letter . . .

Burns

I'd just like to make one quick comment about the surgical escharotomy procedure described on page 5 of the November/December issue of WMN. In cases of severe third degree burns (the only time a patient will need an escharotomy), the tourniquet effect is often nearly immediate. Just in the past two months I've seen patients who needed escharotomy within a few minutes of an extremity burn. And for circumferential burns around the chest, an escharotomy along the anterior and posterior axillary lines may keep a patient from suffocating.

I am not a proponent of having the untrained do escharotomy, but in the case of severe circumferential third-degree burns in the wilderness, it may save a limb or life.

When evacuation is delayed, there may be no alternative to an escharotomy by an untrained person. Those who think about performing an escharotomy should remember two things: (1) third degree burns are totally numb, so the procedure will not hurt and may make the patient's pain better; and (2) to try to avoid nerves, blood vessels, and tendons, cut along the sides of the limb or the chest, not the front or back.

- Keith Conover, M.D., Attending Staff, Mercy Hospital of Pittsburgh; Clinical Assistant Professor, Division of Emergency Medicine, University of Pittsburgh **

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

July/August 1993 Volume 4, Number 4

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WMN Update

This publication has remarkable staying power. Those of you who have been reading the WMN since its inception in May of 1988 have watched its growth. Buck Tilton, Melissa "Bugg" Gray, Bobby Deery and others at SOLO in Conway, New Hampshire planted the seed and published the first year's worth of issues on a monthly basis. Carolyn and I became involved about 18 months after that first issue and expanded the format but decided that a bi-monthly schedule would give us time to breathe. Since then the WMN has survived the westward moves of both principals with all the ensuing changes in printers, post offices, addresses, and banks that make a small business like this work. Now, Buck is sustaining a big league writing career; Bugg is managing the largest business in Pitkin, Colorado; Carolyn is here in Albuquerque working long hours to help Presbyterian Hospital prepare for what promises to be a total revamping of the health care delivery system; and I'm spending lots of time in the field with students from Albuquerque Academy.

We've nurtured that seedling along to the point where it is now a healthy and mature tree. It seems time to plant it in a permanent, sustainable, location. We will do that by turning the production over to Mercury Marketing, a Connecticut-based company that has plenty of successful experience with other health-related newsletters. Expect changes in format, look, timing, and billing. But, of course, expect the quality to remain high.

Carolyn will miss her role as production editor and we'll miss her fine contributions. During the past year, her energy has, in a large part, kept this publication going. Many thanks to you, Carolyn.

Many thanks to you, too, gentle readers. We'll be in touch.

Kurt Thompson

RC 019513

Water Disinfection: A Product Review

by Buck Tilton

Long gone are the days when you could drop your exhausted body to the ground beside a sparkling flow of mountain water and plunge your face into the cold rush for a drink. Enteric pathogens, microscopic life-forms capable of making a human sick, inhabit, to some degree, most of the world's water. How tragic! And, unless you're willing to risk gut-ripping misery, how important to carry some means of water disinfection on extended backcountry trips.

Those microscopic pathogens fall generally into one of three types: 1) Protozoa, often Giardia in the United States, ranging in size from 21 microns down to 5 microns. (One micron is .0000394 inches, or approximately 500 times smaller than the dot over the "i" in this text.) 2) Bacteria, ranging from 30 microns down to .4 microns. 3) Viruses, ranging from .6 microns to .004 microns.

There are three proven ways to guarantee your backcountry water is safe from pathogens:

1) **Boiling.** And, fortunately, the rule is very simple--once the water is hot enough to produce one large, rolling bubble, it is free of organisms that will cause illness. Of course, boiling requires pots and a heat source and some time.

2) **Halogenation.** As for chemicals that kill waterborne pathogens, both chlorine and iodine have been proven effective, given enough of the chemical and enough contact time. They both unfavorably "flavor" the water, and you may have to wait up to one-half hour to be sure the water is safe.

3) **Filtration.** Filters physically remove some of the organisms and contaminants that could cause disease. Filtered water looks "clean", but the purity of the water depends on the specific filter. Few filters, for instance, eliminate viruses. Still, filtration offers the quickest route to reasonably safe water. Here are the best of the backcountry water filters.

Katadyn Pocket Filter

Long before backcounty filtration systems began to proliferate, Katadyn was there. They've been there for over 40 years. Like all finely crafted Swiss products, the Katadyn Pocket Filter, one of Katadyn USA's line of water filters, is dependable, durable, and precisely manufactured. It has the look and feel of a fine tool. A double-action pump brings water up 26 inches of strong, supple hose and forces it through a ceramic filter. A metal strainer at the inlet keeps large debris out of the hose. Clean water squirts out a small spout at the top of the pump, which means you have to aim the flow into your water bottle, a sometimes awkward procedure. The unit weighs in at a solid pound-and-a-half, but packs very neatly into a carrying case. It produces about one quart of water for every 90 seconds of pumping. Pumping requires some effort.

The silver-impregnated ceramic filter's 0.2 micron pore size mechanically and efficiently strains out Giardia and bacteria. The silver creates a bacteriostatic condition... bacteria, fungi, even algae won't grow on the filter ... which means cleaning is simplified. When flow through the filter slows, clean the filter with the supplied brush, and normal function should return. When cleaning, keep in mind you may be scrubbing off a considerable amount of accumulated contaminants. Beware of disposing of these contaminants appropriately, and clean your hands afterwards. Dry the filter before storing, and it will outlast you. Silver does not increase the effectiveness of the purification system, and the Katadyn does not remove chemical pollutants, bad tastes or offensive odors.

The Katadyn Pocket Filter represents an excellent and long-lasting source of safe water. Unfortunately, it's price tag of around $225 will keep it out of some backpacks. But Katadyn does offer a little brother to the Pocket Filter. The Minifilter has the same disinfecting qualities in 7 inches of length and 8 ounces of weight for $150. katadyn Usa, Inc., 3020 N. Scottsdale Road, Scottsdale Az 85251. 1-800-950-0808.

First Need Deluxe

General Ecology has been making water filters for over 10 years. Their line of First Need filters includes the Deluxe Water Purifier, a practical option for the wilderness wanderer. The single-action pump sucks water up 14 inches of sturdy tubing, pushes it through a separate filtering canister, and out 6 inches of discharge hose into your water bottle. If you opt for the pre-filter (an excellent idea) and cap (which attaches to most water bottles), you've got eight parts connected at six places, and it took both my hands and both my feet to operate the system. The whole thing weighs about one pound and packs with relative ease. It pumps about one

pint of water per minute, and the manufacturer claims you can get up to 800 pints before the filter has to be replaced. Pumping requires little effort.

In the sealed canister hides the filter matrix of carbon and proprietary materials, providing safe water in three ways. First, a 0.4 micron pore size physically traps everything larger than that, including Giardia and bacteria, inside the canister. The electrostatically charged surface of the filter holds onto any debris having the opposite charge. And, finally, the carbon adsorbs (causes molecules to stick to its surface) pesticides, herbicides, solvents, even odors and bad tastes such as iodine and chlorine.

On the downside, the ability of carbon to adsorb has a threshold and , once the particular threshold of a substance is reached, the filter will let that particular material through. But the filter will still let water through, so you can't tell that it's no longer adsorbing.

Like all filters, the First Need Deluxe will eventually clog and have to be replaced. You can put off the inevitable by periodically attaching the pump to the filter's outlet and "backwashing" with clean water. Before storage, a flush with a dilute chlorine solution (household bleach will work) further extends the life of the filter by killing off germs or fungi that might be left clinging to it. The pre-filter, which screens out anything 10 microns or larger, increases the filter's life expectancy even more.

All things considered, the First Need's efficiency, portability, and relative low cost make it a great choice. Shopping around, you can usually find the Deluxe for approximately $40, the replacement filter for $25, and the pre-filter for $10. General Ecology, 151 SHEREE Blvd., Exton PA 19341. 215-363-7900, Or place orders at: 1-800-441-8166.

MSR Waterworks

MSR entered the water filter market only a couple of years ago, but the company has a long history of high-quality, innovative gear . . . and the WaterWorks appears to be no exception. The pump is a strong plastic cylinder with a lever-type handle. The long inlet tube includes a float and a weighted strainer, so the end of the tube hangs near the surface of the lake or stream, out of the debris on the bottom. On the outlet end, you can screw the whole pumping unit onto a standard water bottle. Floating inlet, long pumping hand, and convenient outlet make the WaterWorks easy for one person to use. I filled a one quart bottle in less than a minute. Unit weight is about 18 ounces, and comes with a handy carrying case.

MSR utilizes a four-part filtering system, each filter with progressively smaller pores, beginning with a foam sponge in the strainer, continuing to a 10-micron stainless steel filter, on to a carbon filter, and ending with a 0.1 micron membrane. All bacteria, Giardia, and particulate matter stays out of your drinking water. On the downside, the sponge on the strainer's end clogs very easily if there is silt or sand suspended in the water. And periodically, the stainless steel filter needs to be scrubbed, the carbon filter needs to be scraped clean with a knife, and the membrane has to be replaced when it clogs. (Note: The manufacturer recommends replacing the carbon filter after the third scraping. And, as with all carbon filters, it has an adsorption threshold.) Also on the downside, the MSR has several small parts that eventually wear out and need replacing, including an O-ring and a check valve. The company recommends a bleach flush and drying before storing.

The MSR WaterWorks looks like it's going to have relatively high maintenance requirements, and the cost is around $140 for the unit, $30 for the membrane, $20 for the carbon filter, and $12 for the maintenance kit (O-ring, etc.). But considering its portability, ease of use, and effectiveness, this filter is a definite contender. Mountain Safety Research, P.O. Box 24547, Seattle WA 98124. 206-624-7048. 1-800-877-9677.

"Enteric pathogens, microscopic life-forms capable of making a human sick, inhabit, to some degree, most of the world's water."

PUR Explorer

Recovery Engineering's new filter, the Explorer, may prove to be the tool of tomorrow today. A 130-micron strainer on the inlet tube keeps the big chunks out of the pump. (Note: It will still clog if it falls into deep muck on the bottom.) The pump's size (almost 12 inches long) and its large handle make it easy to hold and use. A curved hook-like end on the outlet tube allows you to fill any water bottle quickly, if you don't get too excited pumping. And it's fast. I filled a quart bottle with less than 60 pumps and very little effort. Unit weight is a hefty 21 ounces, with carrying case.

On the inside, the Explorer is really innovative. This is the only pump-feed water filter that is truly a water

(continued on page 4)

"Water . . ."

(continued from page 3)

purifier, meeting EPA standards for the removal of enteric pathogens. A glass-fiber filter with 1 micron pores removes Giardia and small sediment, but the secret is contained in the tri-iodine impregnated resin matrix. Contact with the resin kills bacteria and viruses, and tests done by the Department of Microbiology and Immunology, University of Arizona, support the manufacturer's claims. The iodine, bonded to the resin, adds a little taste to the water the first few times you use the filter, but it goes away after a few gallons have been pumped through. If you just can't stand the taste of iodine at all, an add-on carbon filter is available for an add-on cost of $20.

On the downside, since you can't taste the iodine, you don't know when its effectiveness has worn off. But the manufacturer says the filter element will fail long before the iodine supply is used up.

More ingenuity involves the Explorer's self-cleaning mechanism. When the pump starts to clog, water squirts out a relief-valve on the handle to warn you. Simply twist the handle a quarter-turn and pump a few more times, and a built-in brush scrubs the filter without the pump being taken apart. (Note: Water squirting out the special valve on the handle is not clean.) NO special preparations prior to storage are required.

If you can afford the $130 price, and you don't mind the weight and size, the Explorer is probably your best bet, worldwide. For smaller bank accounts, PUR offers the new Scout at half the price: same resin strainer, half the weight, about one-third the speed, and a little more difficult to pump. And PUR's new bottle adaptor fits any wide mouth Nalgene-type water bottle to make fill-up's easier. recovery Engineering, 2229 Edgewood Avenue South, Minneapolis, MN 55426. 612-541-1313. 1-800-845-PURE.

Timberline

On the lightweight and convenient side of pump-feed filters, it's hard to beat the Timberline. Its plastic pump attaches directly to the separate filter which goes directly in the water source. Unit weight is only 6 ounces, and if that's too much you can leave the pump at home and use the additional plastic tube as a straw to suck water right up from the stream through the filter. This system is very easy to use, and you can pump, or suck, one quart in 90 seconds.

Timberline Filters mechanically strain out all stages of Giardia, but bacteria and viruses will flow freely through this system. In many areas where you hike, Giardia removal will be enough, but, if you're unsure about the presence of bacteria, the use of the Timberline cannot be recommended. And the filter clogs easily when the water source contains sediment and debris. Pre-filtering, with something such as a coffee filter, will eliminate the clogging problem. The manufacturers recommend a vinegar flush and thorough drying before storage.

Cost is under $30. Timberline Filters, P.O. Box 3435, Boulder, CO 80307. 303-494-5996.

PentaPure

Now for a new twist . . . a purification system that requires no pumping. It works via gravity. Water is poured through PentaPure's patented penta-iodide resin, which has been proven to have 1000 times the killing power of the older tri-iodide resin. NASA has been using penta-iodide to guarantee astronauts safe water.

Most convenient for casual hikers is the PentaPure Travel Cup. Its 4 ounces are barely noticeable. Simply place the purifier unit, like a funnel, over the mouth of your water bottle, and pour in the water. It's on the slow side, requiring about two-and-a-half minutes to fill a one quart bottle. Since the resin does not block the passage of things like Giardia, the manufacturers, recommend a wait of three minutes more to ensure everything harmful in the water is entirely dead. The Travel Cup includes a holding cup from which you can fill small-mouthed water bottles. For longer trips and larger groups, PentaPure makes a collapsible Water Jug (1.25 pounds empty) that holds two gallons -- same resin, same microscopically pure water.

The Cup or the Jug will purify 100 gallons of water, but there's no way to know if the resin is used up unless you've kept track of how much water you've poured through it--very inconvenient.

Both the Cup ($29.95) and the Jug ($43.95) are EPA approved. WTC Industries, Inc., 14405 21st Avenue North, Minneapolis MN 55447. 612-473-1625. 1-800-6371244.

Basic Designs

Basic Designs is the one company that gives you a choice between a couple of gravity-feed filters or a pump-feed filter. On the gravity-feed side, the best backcounty choice is the Pocket Size Ceramic Filter. The filter sits in the bottom of a plastic bag made to hang from a tree limb or tent pole. Gravity forces clean water

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down the outlet hose into your water bottle. It only weighs 12 ounces, but it takes about 40 minutes to fill a one-quart bottle. Physical removal of everything down to 0.1 microns is absolute, and an activated carbon core removes trace elements and bad taste. The filter can be cleaned in the field, and the manufacturer claims up to 1000 gallons of filtration before the unit has to be replaced. Suggested price is $69.99.

On the pump-feed side, the new Ceramic Filter Pump has been on the market only a few months. PVC tubing holds the plastic pump directly to the filter which goes into the water. A pre-filter keeps the big stuff out, and the outlet hose, attached to the pump's handle, has a clip to hold it to the lip of your water bottle. One stroke moves one ounce of water, and the filter will last for up to 500 gallons of filtration. Weight . . . only 7 ounces. I haven't tried this one, but the filter's ceramic element should remove, through blockage and adsorption, all pathogens except viruses. At $29.99, this may prove a valuable addition to your choices of water filters. Basic Designs, Inc., P.O. Box 2507, Santa Rosa CA 95405. 707-575-1220.

AquaCure

For those who want to travel very lightly and compactly--and still be able to produce safe, sweet drinking water in the backcountry--there are AquaCure water purification tablets.

AquaCure tablets are a combination of flocculating and coagulating agents (which produce rapid sediment formation) and chlorine (which disinfects the water). Being effervescent, the tablets dissolve quickly, and after 10 to 20 minutes, a sediment containing entrapped pollutants forms and settles to the bottom of your water bottle. Anything left suspended in the water is killed by the chlorine--including bacteria and viruses. The sediment needs to be strained out through any clean material . . . a T-shirt will work. AquaCure is the only water purification tablet that clarifies as well as disinfects polluted water. In clear water of course, no sediment forms, but disinfection still takes place.

Comes in boxes of 30 tablets (suggested retail $7.95) which will treat about 30 quarts of water. Safesport Manufacturing Co., P.O. Box 11811, Denver CO 80211.

Global-KDF "LIFE"

The LIFE (Liquid Internal Filtration Effect) Unit is 7.25 inches long, .75 inches wide, and weighs in at less than 3 ounces. Patented wires, an alloy of copper and zinc, spring out in brush-like fashion when you slide the protective sleeve off of them. Stirring disinfected water for one to three minutes removes the unused chlorine (or iodine) from the water. It sticks to the wires. The result is good tasting water. (Note: The LIFE Unit also removes inorganic contaminants--lead, mercury, other heavy metals.) LIFE's hollow handle has a screw-off lid so you can carry a few disinfection tablets easily and conveniently.

Suggested retail price is $24.95 Global Environmental Technologies, P.O. Box 8839, Allentown PA 18105. 1-800-800-TERRA.

On the Horizon . . .

At this writing, a new water filter with extravagant possibilities awaits mid-August release on the market. The SweetWater stands 7.75 inches tall, weighs in at 11 ounces, and has a diameter of 3.5 inches. Manufacturer claims 1 to 1.25 liters per minute pumping rate. With the optional Biocide Cartridge, this filter promises to get rid of 99.9% of pathogens worldwide. If it lives up to claims, SweetWater could become the filter. Tentative suggested retail price is $49.95. **

One Good Reason to Use a Water Filter: Cryptosporidium

A genus of the protozoa classed as a coccidian parasite, *Cryptosporidium*, a water-borne pathogen, has gained national recognition due to its ability to resist chemical disinfection. Cryptosporidiosis, the diarrheal disease caused by the parasite, produces explosive diarrhea and abdominal cramps following an incubation period of 4 - 14 days. Symptoms usually last 5 - 11 days but may continue up to one month. The disease self-limits, has no effective therapy . . . and is messy.

To avoid the mess, use an effective water filter. A *Crypto* ranges from 4 - 8 microns in size (*Giardia* runs 5 - 21 microns), and any filter that eliminates *Giardia* will almost always eliminate *Cryptosporidium*. Well-proven are the filters from PUR and First Need.

Land of Enchantment?

By Ken Thompson

New Mexico has gotten a lot of national press recently because of the hantavirus outbreak that is focused on the Navajo reservation in the northwest corner of the state. All the negative publicity has cut into the number of people visiting the area: tourism is off by 20 to 40 percent.

Knowing that the Southwest is a popular outdoor vacationing spot for many readers, I thought you might have some questions about what's really going on out here. The answers are based on information provided in the July 19th report issued by the local Department of Health (the CDC, UNM researchers, the Navajo Nation, and many others meet regularly to keep tabs on the disease).

How many people have contracted the disease and where are they from?

Twenty-five people in New Mexico have developed a clinically compatible illness; 11 of these have been confirmed serologically to have antibodies to a hantavirus. The cases are not confined to the Navajo Nation. Three have been diagnosed in the Albuquerque area, one in northeastern NM, one in north-central NM, and two in southwestern NM. Arizona, Colorado, Utah, and Texas have also reported cases. Of the 25 cases in New Mexico, 11 people have died; eight of the deaths are confirmed by the CDC to have been hantavirus cases. The disease is not limited in any way to gender, ethnic background, or age.

What are the common symptoms?

Typically, cases have had a non-specific prodrome for several days before developing respiratory distress. All persons have had fever and muscle aches, and most have had at least one of a group of other symptoms including cough, headache, conjunctivitis, and abdominal pain. These symptoms are, of course, typical of many diseases. Those who have the disease develop an acute onset of (dyspnea) difficulty breathing, which gets progressively worse. Most cases have required mechanical ventilation.

Where does it come from?

Because of an unusual pattern in laboratory studies and because no known virus has caused this kind of illness in the past, this is probably a new type of hantavirus or at least a variant of a known virus. It is likely that the disease has been in the rodent populations for many years, but previously caused so few illnesses and deaths that the cause remained unknown.

How is it transmitted?

The disease can be spread from rodents to people. The virus is in the rodent's urine and possibly saliva and feces. The virus can become airborne through misting of the urine or dust from feces or nests. The exact means of transmission are being investigated. The CDC has been trapping and testing rodents. Of 169 deer mice tested, 56 (34%) had evidence of antibody to hantavirus. Of 22 pinion mice tested, 2 (9%) had antibodies to hantavirus and six (8%) of 73 chipmunks had evidence of antibodies to hantavirus. Studies are underway to determine if the virus can be spread from person-to-person; the good news is that other viruses of this type are not spread between people. There has been no spread to either family or health care workers.

Is it safe to travel in the area?

There are no travel restrictions. Avoid contact with rodents.

Do I need to be worried if I come to the area and get sick?

The Department of Health recommends that anyone who develops a fever and muscle aches should see a physician.

Is it safe to camp in the area?

Common sense suggests the following guidelines:

- Be selective about the choice of a tent site. Avoid obvious rodent nests, etc.
- Keep all food in tightly sealed containers and off the ground away from your sleeping area.
- Keep eating utensils sparkling clean.
- Wash your hands regularly and thoroughly.
- Leave pets at home.

How do I get more information?

A toll-free public information line has been established by the New Mexico Environment Department: 1-800-879-3421. Physicians and health care facilities can get specific information on recognition and treatment from the Division of Epidemiology, Evaluation and Planning at 505-827-0006 **

by Rick Bennett, Ph.D., W.E.M.T.

Everywhere you go, they go too. Everything you do, they involve themselves in. From the stream to the latrine; from the nose to the eye; from the blister to the boil; from the itch to the compound fracture; our hands and fingers are intimately involved. The hands, more so than any other instrument of human activity, get into everything we do. Very valuable tools, they very effectively transfer disease-causing agents, such as bacteria and viruses.

Prior to the 1800's and the germ theory of disease, the surgeon performed autopsies and delivered babies all within a morning's work, perhaps without a thought given to the benefit of a simple hand washing. Today such practice would be unthinkable and grossly negligent. Yet, even today, human hands account for 25 to 40% of all food-borne illness. Food-borne illnesses make vacations miserable and annually cost the nation approximately 8 billion dollars in medical expenses, lost wages and business, and in the ubiquitous legal fees. In the wilderness setting, food-borne illness can ruin a day or two of a backcountry trip, at best, and may result in an emergency evacuation in the worst case. A little more attention given to hand sanitation can inhibit the transfer of disease through food handling and can increase the effectiveness of wound care by helping to avoid the complications of infection.

Microbes On and In the Body

The body is loaded with microorganisms. Life would not be possible without them and only a few types pose sigrificant potential to cause disease. Microbes can be **resident** or **transient**. The resident flora of the skin make the skin slightly acid and that helps to resist other microbes like yeast and fungi. Resident flora of the gut aid the synthesis of important compounds like vitamin K (the substance that facilitates normal blood clotting). In addition, the normal bowel microbes fill ecological niches to exclude colonization with disease-causing bacteria like Salmonella.

Resident Microbes of the Skin

The outer skin looks like the surface of Arizona from 36,000 ft. There are cracks, fissures, valleys, and plateaus. Unlike Arizona, however, the dead and armored skin cells lie in an overlapping, plate-like arrangement. Within these tiny cracks and the major canyons of the skin, microbes attach themselves tightly. Normal hand washing with detergents, soaps, and even germicides remove only a portion of the skin's bacterial flora. Skin contains many bacterial types including members of the Staphylococcus genus. While most of these are of little concern, Staph. aureus is capable of causing problems ranging from pimples and boils to abscesses and severe skin and bone infections. Many people carry significant Staph. aureus populations on their skin.. It is estimated that 40% of all people carry Staph. aureus in the outer nasal area, from which point the organism is distributed widely. Logically, the common, well-used and multi-purpose bandanna is an item of concern and should be handled with discretion.

Transient Germs

As the name implies, these bugs, ranging from bacteria to yeasts, viruses, and parasites, are picked up from outside sources and reside with us for only short periods of time. They will, however, set up housekeeping if the conditions will allow; to our benefit, they do not often find ideal conditions. These transients can be commonly found under the nails and in the deeper fissures of the finger tips. Bugs like the fecal E. coli and the Norwalk (flu) virus can be isolated from the hands. Sources of transient pathogens include the following: infected cuts pimples, and boils; fecal material from typical toilet

(continued on page 8)

Give Me A Hand . . .

(continued from page 7)

paper use; handling pets; contaminated food, soil, and water; and nasal secretions.

Persons with badly chapped or abraded hands should be relieved of food preparation duties in favor of someone with a healthier set of hands. If this is not an option, a new pair of disposable gloves like those commonly used in emergency care will prevent the incidental contamination of food and utensils. However, the routine use of gloves for food handling staff is not recommended, especially in the summer as warmth and moisture inside the glove will encourage skin bacteria to grow, and a small tear in the glove could add more bacteria to the soup than would appear from a properly washed and dried hand.

Hand Washing, Food-borne Illness, and Secondary Infection

Proper hand washing for people who prepare meals is a simple task, yet it is seldom performed correctly. In one study of professional foodservice personnel, 60% of the people did not wash their hands at all. Research has also revealed that secondary infection is reduced when proper hand washing is practiced after defecation and before eating. Enteric disease due to agents like Shigella, Giardia, and Rotavirus in employees at day care centers was reduced when proper hand washing became common practice. It is always refreshing to discover that research proves that "moms" have been right all along.

Proper Hand Washing for Sanitary Wound Management or Food Handling

The technique recommended within the food industry is the Eight Step or Double Wash Method.

1. **Wet Hands**--Hot flowing water (100 to 120 degrees F) at two gallons per minute is essential for the reduction in total bacteria load.

2. **Soap**--Soap is applied to the hands to assure a good lather (approximately 1/2 teaspoon is needed).

3. **Lather**--Work the lather all over the hand surfaces, concentrating on the fingernails and tips.

4. **Brush**--Use a nail brush to remove debris from under the fingernail. Fecal bacteria are usually found there.

5. **Rinse**--Rinse with the same temperature and volume of water used to wet the hands. This step is essential for removing bacteria.

6. **Re-soap and lather**--A second wash is needed to remove additional bacteria. The brush is not used. The lather is applied up the forearm.

7. **Rinse**--Rinse as before.

8. **Dry**--Drying with paper towels is essential to remove the remaining microbes that are suspended in the water. Water gives bacteria wings.

That may seem simple enough, but too few people understand the process and act accordingly.

Wilderness Applications

One commodity that is rare in the backcountry is flowing hot water. In some camp situations there may be ample hot water for hand washing in preparation for food handling or for sanitary wound management. However, in most cases ample hot water will not be an option. An adaptation that may be appropriate for short term hand sanitation is the addition of a soap germicide in the hand washing procedure. In this application, drinking water is used along with a soap germicide such as Betadine Scrub or a similarly "tamed" iodine detergent product.

Modified Backcountry Hand Washing Technique

1. **Rinse**--Rinse hands with a volume of water sufficient to thoroughly wet them.

2. **Germicide Soap**--Add a small palm full of germicide soap to the hands.

3. **Lather**--Work the lather all over the hands and fingertips.

4. **Brush**--Use a fingernail brush to scrub under the nails and nail beds.

5. **Rinse**--Rinse with enough water to remove the lather.

6. **Re-soap**--Repeat the germicide soap step.

7. **Rinse**

8. **Dry**--Remove all moisture with a paper towel or clean dry towel. Care must be exercised when using non-disposable towels.

This modified procedure substitutes germicide soap for volumes of hot water. The level of sanitation should be comparable in most situations and conserves drinking water. In test situations as little as 500 cc, slightly more than a pint of water, was used for hand sanitation.

Those wonderful tools that go everywhere with us, remain a potential source of food contamination and wound infection. Both of these microbial problems, at worst, can be life-threatening. More commonly, the hands carry microbes that make our lives miserable and shorten backcountry trips. Common sense and a couple extra minutes preparation time can make an enormous difference. **

Rick Bennett is an instructor with the Wilderness Medicine Institute and president of Applied Life Sciences. He also is a Food and Water Science Advisor with he University of California Cooperative Extension with over 15 years of experience in food and medical microbiology. Rich is a member and trainer with both the Challenge Sonoma Adventure Ropes Course and the Sonoma County Search and Rescue Team.

Thoughts From NOLS On Hygiene

From the NOLS Wilderness Education Handbook:

The pristine character of the wilderness environment often lures students into a sense of false confidence, believing that sound hygiene is unnecessary and that all water is safe to drink. The health of the individual an the group depends heavily upon eliminating the spread of food and fecal borne illnesses, as well as having safe drinking water.

1. Hand Washing must become a daily habit:
   - wash hands after relieving yourself, especially after a bowel movement
   - wash hands before preparing or eating a meal
   - use toilet paper or be proficient with natural toilet paper
   - keep nails trimmed and clean

2. Do not share the following personal items: lip balm, water bottles, personal eating utensils, partly consumed food items, toothbrushes

3. The major vectors of food-borne illness are contaminated food and utensils:
   - the healthy, not the sick and dirty, should prepare food
   - boil cooking utensils daily
   - prepare and serve food with clean cooking utensils
   - plan meals to avoid storage of cooked food ("Keep food hot or keep it cold, but don't keep it long!" . . . Tod Schimelpfenig.)
   - Pour foods from bags, don't reach in

From the Proceedings of the 1991 NOLS Wilderness Education Conference:

"Out of a total of 529 illnesses reported at NOLS from 1984-89, 60 percent were due to non-specific viral syndromes or diarrhea."

"Preventative measures implemented by NOLS as a result of this study (group cooking in some programs, chlorine rinses, aggressive hand washing, etc.) appear to have reduced the rate of hygiene-related illness."

From Tod Schimelpfenig, Safety & Training Director, NOLS 288 Main St., Lander WY 82520:

". . . training for wilderness leaders should include prevention, recognition, and treatment of athletic injuries, wounds, dental problems, and hygiene-related illness. To effect a substantial reduction in injury and illness rates for multi-week wilderness activities, prevention strategies must focus on athletic injuries and hygiene."

From an unknown source:

"Outdoor leadership has come down to teaching butt-wiping and hand-washing!" **

Wilderness Medicine Courses

SOLO

RFD 1, Box 163
Tasker Hill
Conway, New Hampshire 03818
Telephone: (603) 447-6711

NEW! Wilderness EMT Bridge Course

- October 11 - 22 at SOLO
- Cost: $695.00
- This course is just the ticket if you've completed a WFR within the past year and would like to upgrade your certification to Wilderness EMT.

Wilderness First Responder

Costs for the following courses will vary:

- September 10 - 19 at SOLO
- October (exact dates TBA) at Wolfcreek, Georgia
- October 25 - November 5 at the AMC, Pinkham Notch, New Hampshire
- December 10 - 20 at the Hulbert Outdoor Center, Vermont

Wilderness EMT

- September 20 - October 15 at SOLO
- Cost: Approximately $1,325.00

Wilderness Medicine Institute

P.O. Box 9 - Pitkin, Colorado 81241
Telephone: (303) 641-3572, Mon-Thurs 9 a.m. - 1 p.m.

Wilderness EMT

November 22 to December 16 in Kelly, Wyoming
January 3 - 28, 1994 in Pitkin, Colorado
- Cost: $1,350.00

Wilderness First Responder

September 4 to 13 in Flathead Lake, Montana
- Cost: $425.00

October 25 - November 5 in Jackson, Wyoming
- Cost: $350.00

Deluxe Wilderness First Responder

September 25 to October 4 at the Selway Lodge in the Selway Bitteroot Wilderness
- Cost: $750.00 (includes deluxe accommodations and meals)

Wilderness and Rural EMT Module

October 28 to November 9 in Boulder, Colorado
- Cost: $300.00

Win a FREE Wilderness First Responder Course

Melissa Gray and Buck Tilton need your favorite recipes for their upcoming publication *Cooking From Your Backpack*. Enter your recipe and become eligible for the Grand Prize drawing for a free WFR given by the Wilderness Medicine Institute. (Your recipe doesn't have to be accepted for the book to win the prize; any entry will put your name in the hat). If your recipe is selected, you will get your name in print (so you can finally impress your Mom), a copy of the book (so you can impress your trail-mates), and , of course, a chance to win the Grand Prize.

Categories include: Drinks, Eye-Openers for Morning, Snacks for the Trail, Baked Goodies, One-pot and Multi-course Dinners, High Altitude Specialties, Desserts You've Known and Loved, Cold Weather Stand-bys, Foraging Favorites, and Delights That Defy Description. The drawing will be held September 15, so don't delay. Send entries to Melissa Gray or Buck Tilton, P.O. Box 9, Pitkin CO 81241.

Wilderness Medicine Bookshelf

Bears Do It! Bees Do It! Even Folks in BVD's Do It!

ICS Books, Inc. has just released yet another of Buck Tilton's books on specific backcountry skills: Sex in the Outdoors. A humorous and fun look at a common camping pastime. Everything you wanted to know about sex in the outdoors, but were afraid to ask. From the history of sex to the reasons for sexual contact in tents, this book is thoughtful and provocative.

Discover special positions for special places! Understand sex guidelines, etiquette, and even chemistry with an environmental perspective. Employ safe sex protocols. Don't buy this book if you want profanity or pornography! Do buy it if you have a genuine interest in great fun in the great outdoors! To order call toll free, 9 a.m. - 5 p.m. CST, 800-541-7323.

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The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

SEPTEMBER/OCTOBER 1993 ISSN-1069-6818 VOLUME 4, NUMBER 5

Review of the Best:

WILDERNESS-RELATED BOOKS ON MEDICINE, EMERGENCIES, AND RESCUE

BY BUCK TILTON

WILDERNESS MEDICINE: GENERAL

Medicine for Mountaineering, edited by James A. Wilkerson, MD, 4th Edition 1992, 416 pages, suggested retail, $16.95. (5.25" x 7.75" format.) Published by The Mountaineers Books, 1011 SW Klickitat Way, Suite 107, Seattle, WA 98134. (800) 553-4453.

With his first edition published in 1967, Wilkerson's ground-breaking editorial effort ranks as the grandfather of wilderness medicine books. Unlike some grandfathers, this one has managed to stay young by going through several updates. Very little is going to happen out there that Wilkerson and friends haven't foreseen and covered adequately.

Written by physicians to prepare responders "for the medical problems that may be encountered in mountaineering and other wilderness activities", this book has been carried in thousands of backpacks (despite its bulk and weight). Presupposing, in many instances, that the reader has some prior knowledge and training, *Medicine for Mountaineering* speaks at a level that might make it difficult for the raw amateur to use. It remains, however, a premier resource for the assessment, treatment, and prevention of problems in the wild outdoors.

Mountaineering First Aid, by Martha Lentz, Ph.D.,RN; Steven Macdonald, MPH, EMT; and Jan Carline, Ph.D., 3rd Edition 1985, 112 pages, suggest retail, $6.95. (Slim 5.25 x 8.5: format.) Published by The Mountaineers Books, Seattle WA.

First published in 1972 this little book fills in some of the gaps left by the presuppositions of *Medicine for Mountaineering*. The procedures are based on a step-by-step approach, taking the rescuer from trip-planning through assessment and medical care to rescue. Summary checklists make the book handy to use, and humorous illustrations clarify as well as entertain.

As an introduction to outdoor medicine, this book serves as an excellent resource. But, as the title says, this is a first aid book, and sometimes first aid ("the immediate care given") is not enough. What about a dislocated shoulder? *Mountaineering First Aid* recommends splinting it the way you find it. The patient, and the concerned wilderness care provider, would like to have it back in its natural place.

Wilderness Medicine, by William Forgey, MD, 3rd Edition 1987, 151 pages, suggested retail, $7.95. (5.5" x 8.5" format.) Published by ICS Books, 1370 East 86th Place, Merrillville IN 46410. (800) 541-7323.

Doc Forgey, the Father of Wilderness Medicine, has been so active for so long in wilderness medicine some folks just refer to him as "Doc" and expect you'll know who they mean. Changing medical technology and the growing availability of non-prescription medical supplies have produced many changes in this book since the first edition came out in 1979. It remains one of the best, a no-nonsense guide to treating problems when the "Doc" is far away.

Each of the treatments recommended by this book are looked at from three viewpoints: what first aid measures are necessary, what non-prescription items can be carried to help with the treatment, and what prescription medications, if you can get them, would be useful. Detailed instructions for just about everything you can imagine—from pre-trip medical planning to suturing shut a gaping wound—are included. Doc is refreshingly unafraid to get down-and-dirty, as in the "dissection method" of fishhook removal: "...we have to resort to what will probably be a difficult experience for the victim and surgeon alike."

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NOTE TO OUR READERS:

With this issue of Wilderness Medicine Newsletter, we are introducing a slightly modified design in 8 pages. The length and quality of the articles and information however, have not been changed. We are committed to providing you with the best and most up-to-date information on the topic of wilderness medicine. Thank you for your continued support.

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Medicine for the Backcountry, by Buck Tilton, MS, and Frank Hubbell, DO, 1990, 158 pages, suggested retail, $9.95. (6" x 9.25" format.) ICS Books, Merrillville IN. (2nd Edition due out in 1994.)

This is a great book: As co-author I felt deeply obligated to say that. For over 15 years SOLO, a training center in New Hampshire, has been offering wilderness medicine programs, and this little book was written as a text for the school's two-day course. Avoiding assumptions about the reader's previous knowledge, it starts from the moment the accident occurs and takes the reader through a complete assessment and treatment of the most usual medical problems. Scenarios from real-life and illustrations help the information come alive. Easy reading, with brief outline summaries of each chapter, make this book useful for anyone who travels where doctors are not around. And, unlike many outdoor medical books, a heavy emphasis is placed on preventive techniques. A healthy addition to any outdoor library.

Backcountry First Aid & Extended Care, by Buck Tilton, 2nd Edition 1993, 56 pages, suggested retail, $3.99. (slim 4" by 5" format.) ICS Books, Inc., Merrillville IN.

The high points of *Medicine for the Backcountry*, updated and designed for quick reference, *BFA&EC* was chosen by Atwater Carey, Ltd., to be used exclusively in every Outdoor First Aid and Medical Kit. *BFA&EC* was offered as a selection of the Outdoor Life Bookclub.

Medicine for the Outdoors, by Paul S. Auerbach, MD, 2nd Edition 1991, 347 pages, suggested retail, $14.95. (5.5" x 8.25" format.) Published by Little, Brown and Company, Ordering Department., 200 West Street, Waltham MA 02154. (800) 759-0190.

Dr. Auerbach avoids unnecessary medical terminology to produce an easy-to-read, easy-to-understand book that is nicely balanced between a bare bones approach (the very basics) and an exhaustive approach (everything you could possibly imagine going wrong).

A few problems arise when a recommended treatment falls short of meeting the needs created by some patient's emergencies. This book states boldly, for instance, NEVER MOVE THE NECK TO REPOSITION IT (if you suspect the neck may be broken). Not a bad idea most of the time, but sometimes patients do better when their necks are gently and properly aligned. Just make sure you have been adequately trained before you try it.

Pocket Guide to Wilderness Medicine, by Paul G. Gill, Jr., MD, 1991, 204 pages, suggested retail price $9.95 (3.5" x 7.5" format, slips into side pocket of pack.) Published by the Fireside division of Simon & Schuster, Rockefeller Center, 1230 Avenue of the Americas, New York, NY 10020.

Dr. Gill writes well. His style is easy, unpretentious, informative, understandable...and fun. Each chapter begins with a snappy intro, many of them from true-life experiences. *Pocket Guide* rolls right into the basics of life support, then on to common traumatic injuries and environmental emergencies. It's full of functional wilderness advice: "If you don't pop that (dislocated) shoulder—or elbow, finger, or hip—back in right away, swelling and muscle spasm will make the job next to impossible." The final two chapters are on wilderness survival and medical kits.

Approaching topics with the basics in mind, Dr. Gill helps prepare the untrained to take care of themselves and their friends. This is not a book of high-sounding medical jargon and in-depth treatments. It is an extremely practical book and, as the title implies, a quick reference for appropriate care.

(Note: Dr. Gill's second book, **A Water-lover's Guide to Marine Medicine,** is due out any day now, but was not available at review time.)

Far From Help! Backcountry Medical Care, by Peter Steele, MD, 1991, 241 pages, suggested retail, $14.95 (paperback), $19.95 (cordura packcloth). (5" x 7" format packs easily.) Published by Cloudcap, P.O. Box 27344, Seattle WA 98125. (206) 365-9192.

Dr. Steele brings over 30 years of work in wilderness medicine to the printed page in 23 chapters of "plain English" covering everything from Preliminary Information through Serious Conditions to Common Ailments. His wealth of mountaineering experience is evident in this book as well as in several others including *Doctor on Everest* (1972) and *Medical Care for Mountain Climbers* (1976) Dr. Steele builds solidly on a foundation of simplicity and improvisation, both of which are key elements in wilderness medicine. And he insists, with complete appropriateness, that successful treatment in the wilderness is much more a result of knowledge and ability than of proper equipment.

His literary trademark has become an economical style of writing that may leave the medically uninitiated at a loss regarding some treatments. As a reference for folks who have some prior training, this little book may prove extremely valuable. A lot is covered in a few words, and the packcloth edition is virtually indestructible.

Wilderness and Rural Life Support Guidelines, edited by Robert J. Koester, 1991, 60 pages, suggested retail, $4.95. (4" x 7", ring-bound format.) dbS Productions, P.O. Box 1894, University Station, Charlottesville VA 22903. (800) 745-1581.

Definitely for someone who has been trained in wilderness medicine, this is a flip-chart of concise outlines on the treatment of heat and cold problems, altitude illnesses, venomous bites and stings, and the other most common emergencies that arise in remote places. Extensive appendices cover patient surveys, burn tables, CPR, rescue, and medications. Printed on waterproof paper inside a plastic cover, this book is designed for backcountry pockets.

NOLS Wilderness First Aid, by Tod Schimelpfenig and Linda Lindsey, 2nd Edition 1991, 356 pages, suggested retail, $12.95. (5.25" x 8.25" format.) Stackpole Books, P.O. Box 1831, Harrisburg PA 17105. (800) 732-3669.

Intended as a text for the first aid section of NOLS semester courses, this book will help train any outdoor enthusiast to 1) prevent, recognize, and treat the common wilderness medical emergencies, and 2) stabilize the severely injured and ill for evacuation. Some of the information you won't find in many other books includes camp hygiene, the effects of stress on rescuers, and emergency procedures for outdoor groups. It is, as it should be, a reflection of the way NOLS does things, and it serves as an excellent resource, providing a sound basis for making critical judgments about patient care in the wilds.

Outdoor Emergency Care, by Warren D. Bowman, Jr., MD, 1988, 466 pages, suggest retail, $23.50. (8.5" x 11" textbook format.) National Ski Patrol, 133 South Van Gordon Street, Suite 100, Lakewood CO 80228.

BEST COPY AVAILABLE

Written as the text for the NSP's Winter Emergency Care course, nobody will want to carry this huge book in his or her backpack. But, as a source of information on wilderness medicine, especially for dealing with snowy environments, this book deserves a close read. Anatomy and physiology are covered, as well as fascinating chapters on patterns of injury, sorting of multiple casualties, and naturally, ski injuries. Few men have selflessly contributed as much to wild medicine as Dr. Bowman, and this publication reflects a lifetime of experience.

Management of Wilderness and Environmental Emergencies, edited by Paul S. Auerbach, MD, and Edward C. Geehr, MD, 2nd Edition 1989, 1068 pages, suggested, price $109.99. (8.5" x 11" hardcover textbook format.) C.V. Mosby Company, 11830 Westline Industrial Drive, St. Louis MO 63146.

Sixty-one contributors lent their expertise to this massive and authoritative compendium of wilderness medical knowledge, and no other book provides more wild medicine information between its covers. Written by physicians for physicians, this text will send non-docs on regular visits to a medical dictionary. From the chapter on Accidental Hypothermia: "Reentrant dysrhythmias are caused by decreased conduction velocity and absolute refractory periods in the setting of increased myocardial conduction time." (Cold hears beat weird.)

In addition to topics expected in such a text, unexpected pluses include: Wildland Fires, Aeromedical Transport, Avalanches, Zoonoses, Emergency Veterinary Medicine, and Foreign Travel and Exotic Diseases.

As a resource for the very interested, theirs is no better book.

TRAVEL MEDICINE

Traveler's Medical Resource, by William W. Forgey, MD, 1990, 894 pages, suggested retail, $19.95. (6" x 9" format.) ICS Books., Merrillville IN 46410.

With specific information on 219 countries, this definitive work covers disease risk profiles with descriptions and prevention, current advisories on travel and political unrest, immunization requirements and availability, insurance plans, jet lag prevention, and on and on. Of special interest is *TMR's* integration with a computerized advisory network to provide up-to-the-minute updates on travel news to specific spots. Traveling to wild places outside the U.S.? Check with Doc Forgey first.

Two books in one, *TMR* contains the smaller book *Traveler's Self Help Guide*, available separately for $6.95.

International Travel Health Guide, by Stuart R. Rose, MD, 390 pages, suggested retail price $16.95 plus $3.00 shipping. Travel Medicine, Inc., 351 Pleasant Street, Suite 312, Northampton MA 01060. (800) TRAVMED.

A copy was unavailable to the us at review time, but Dr. Rose's reputation in travel medicine is well-established, and his book promises to be concise and informative.

Traveling Healthy & Comfortably, bimonthly newsletter published by Karl Neumann, MD, 108-48 70th Road, Forest Hills NY 11375. Six issues for $24.

Neumann says this newsletter is for "veteran travelers, physicians and travel professionals." Everything from cold adaptation and frostbite prevention to picking sunglasses and understanding malaria, the stuff of *TH&C* is always up-to-date, easy-to-read, and highly informative.

The Diabetic Traveler, quarterly newsletter published by Maury Rosenbaum, an insulin-dependent diabetic. P.O. Box 8223 RW, Stamford CT 06905. Four issues for $18.95.

Simply the best regularly published information source for the diabetic who travels.

The Pocket Doctor, by Stephen Bezruchka, MD, 2nd Edition 1992, 96 pages, suggested retail, $4.95. (Slim, 4" x 6" format.) The Mountaineers, Seattle WA.

Clear, concise, sometimes light hearted, packed with information on preventing injury and illness...written by a well-spoken emergency physician...this is undoubtedly the best little book on caring for yourself and others while traveling the international circuit.

ALTITUDE MEDICINE

Mountain Sickness, by Peter H. Hackett, MD, 1978, 77 pages, suggested retail price $4.95. (slim 4.5" x 6.5" format.) American Alpine Club, 113 East 90th Street, New York NY 10028.

Although old by modern medical standards, this little book still represents the most concise, no-nonsense, practical guide to recognizing and preventing altitude problems. Dr. Hackett ran the medical research station on Denali at 14,000 feet for seven years.

High Altitude Medicine and Physiology, by Michael P. Ward, MD, James W. Milledge, MD, and John B. West, MD, 515 pages, suggested retail, a lot. (6.5" x 9.5" hardcover text format.) University of Penn Press, Blockley Hall, 418 Service Drive, Philadelphia PA 19104.

Written by three British physicians with excellent mountaineering reputations, and first published in London, this book is most appreciated by the medically well-grounded, i.e., other physicians. But anyone interested in everything about high altitude medicine will find no more complete text. The authors cover a wide range of topics including the history of mountain sickness, geography and weather patterns of various mountain regions, physiological changes occurring at high altitude, and diseases seen in both newcomers to and permanent dwellers at high altitude.

High Altitude: Illness and Wellness, by Charles S. Houston, MD, suggested retail, $6.99, 80 pages (6" x 9" format.) ICS Books, Inc., 1370 E. 86th Place, Merrillville IN 46410. (800) 541-7323.

For those who remember *Going High*, and the 1987 rewrite *Going Higher*, the name Charles Houston may be synonymous with high altitude medicine. As director of the hyperbaric chamber simulated "climbs" to beyond earth's highest point of land — Operation Everest-One and, later, OE-Two — and as director of the pioneering medical research station on Mount Logan, Dr. Houston has been highly active in altitude medicine for more than 50 years. *High Altitude: Illness and Wellness* is his latest book.

The various forms of altitude illness may affect anyone from novice to experienced mountain traveler who goes too high too fast. About one our of every five visitors to mountain resorts develops some type of altitude illness. Some will

die. Beginning with a brief history of altitude awareness, this book takes you through the best simple physiology of oxygen utilization and the process of acclimatization I've ever read. The following sections on the recognition, treatment, and prevention of altitude problems are especially good. Only the portion on gas laws left me partially pressured.

"Here I have tried," writes Dr. Houston, "to write in ordinary language, not in medical jargon." And well he succeeds, writing form the heart as well as anyone on a topic that is definitively scientific. Who else but a poet would quote Byron in between discussions on the composition of air and on the process of ventilation: "Great things are done when men and mountains meet." For anyone who goes high—climber, skier, hiker—we strongly recommend *High Altitude: Illness and Wellness*.

ENVIRONMENTAL MEDICINE

Environmental Emergencies, by Charles E. Stewart, MD, 1990, 411 pages. (7" x 10" softcover text.) Williams & Wilkins, 428 East Preston Street, Baltimore MD 21202.

Heat, cold, bites, stings, lighting, drowning...Dr. Stewart's book is easy-to-read, fun-to-read ("The ancients expressed their awe of the forces of nature that surrounded them and deified the forces that shook, baked, froze, and pelted them."), well-organized and positively the best overall book on the subject available today.

Dangerous to Man, by Roger A. Caras, 1975, 422 pages, suggested retail, $7.95. (6" x 9" format.) Stoeger Publishing Company, 55 Ruta Court, South Hackensack NJ 07606.

This is not a medical book, although several appendices deal with the treatment of bites and stings. It's just that nobody writes about the natural world better than Mr. Caras, and in this one, he talks about the mammals and reptiles and insects, even the birds and clams, considered dangerous to humans. A wonderful resource.

A Medical Guide to Hazardous Marine Life, by Paul Auerbach, MD, 2nd Edition 1991, 62 pages, (6" x 9" spiral bound.) C. V. Mosby Co., St. Louis MO.

Probably no one knows more about marine medicine than Dr. Auerbach. In this handbook, full of shiny color photographs, he outlines what should be done for victims injured by marine life worldwide.

Hypothermia, Frostbite, and other Cold Injuries, edited by James A. Wilkerson, MD, 1986, 105 pages. (6" x 7.5" format.) The Mountaineers, Seattle WA.

As a quick read, this is probably the best source of information on the prevention, recognition, and prehospital treatment of cold injuries. Wilkerson is assisted by Cameron C. Bangs, MD, and John S. Hayward, MD, two of the foremost cold injury researchers to ever send a shiver down a volunteer's spine.

RESCUE

Basic Essentials of Rescue from the Backcountry, by Buck Tilton, 1990, 60 pages, suggested retail, $5.99. (6" x 9" format.) ICS Books, Inc., Merrillville IN.

No other book on the market fills the niche between exhaustive explanations of intricate rescue techniques and outlines of what-to-do. Here find understandable, important information on pre-trip planning, deciding to rescue or not, self-rescue, litter packaging, carrying, improvising, and more.

River Rescue, by Les Bechdel and Slim Ray, 1985, 227 pages, suggested retail, $9.95. (5.5" x 8" format.) Appalachian Mountain Club, 5 Joy Street, Boston MA 02108.

Indispensable for anyone who spends a lot of time getting wet in rivers, and essential for river rescue professionals. Bechdel, who owns and operates the Idaho-based Canyons, Incorporated, and Ray, who works for North Carolina's Nantahala Outdoor Center, have written the best book on river rescue, ever.

Wilderness Search and Rescue, by Tim J. Setnicka, 1980, 640 pages. (6" x 8.5" format.) Appalachian Mountain Club, Boston MA.

Long considered the Bible of Wilderness Rescue and, overall, still the best book on search management, the tools of rescue, and detailed descriptions of rescue systems. Setnicka has had a long career in SAR for the National Park Service.

Rope Rescue Manual, By James A. Frank and Jerrold B. Smith. 139 pages. Suggested retail, $24.95.

This text covers how to set up a rescue team, the tools you will need, setting up at the site, different systems you can use, and what to do throughout the rescue. One chapter uniquely features "classic" rescues in generic form to prove that, while each rescue may look different, the fundamentals remain the same.

Dive Rescue Specialist Training Manual, by Steven J. Linton, Damon A. Rust, and Daniel Gilliam. 81 pages. Suggested retail,$15.95.

If you are new or old to dive rescue, this manual will prove valuable. Everything you need to know about gear selection, scene evaluation, different search techniques, how to conduct criminal investigations under water...and more.

OTHER NOTEWORTHY PUBLICATIONS

Basic Essentials of Avalanche Safety, by Buck Tilton, 1992, 68 pages, suggested retail, $5.99. ICS Books, Inc., Merrillville IN.

The best short book on avalanche safety.

Basic Essentials of First Aid for the Outdoors, by William W. Forgey, MD, 1989, 62 pages, suggested retail, $5.95. ICS Books, Inc., Merrillville IN.

Lots of common simple problems dealt with in a straightforward manner.

Going Higher, by Charles S. Houston, MD, 1987, 272 pages. Little, Brown, and Company, Boston.

The revised and expanded Going High, the book that got the altitude medicine snowball rolling.

High Angle Rescue Techniques, by Tom Vines and Steve Hudson, 1989, Kendall/Hunt Publishing Company, Dubuque IA.

A safe and detailed textbook approach to high angle rescue.

Hypothermia: Death By Exposure, by William W. Forgey, MD, 1985, 172 pages, suggested retail, $9.95. ICS Books, Inc., Merrillville IN.

Once the gold standard, this book is still useful, touching some topics hard to find in other resources, e.g., frozen lung, chilblain.

Manual of U.S. Cave Rescue Techniques, by the National Cave Rescue Commission and the National Speleological Society, 1988. and,

On Rope: North American Vertical Rope Techniques for Caving, Search and Rescue, Mountaineering, both publications of the National Speleological Society, Cave Avenue, Huntsville AL 35810. (205) 852-1300.

Preventing Seasickness

BY BUCK TILTON

Seems as if all of us are susceptible to motion sickness at one time or another. Indications suggest strongly that stomachs on the verge of throwing up feel better if there's a little food in there with the nausea . . . at least severe symptoms should be alleviated. Eat lightly and often, so there's always something in the stomach for it to processed. Stay away from fatty foods, which don't seem to help, and stay mainly with starchy foods such as breads, cereals, and crackers.

Face forward, instead of looking off to the side of the boat. Keep your eyes on the horizon. That helps me a lot. Some people find that it helpful to contemplate a topic that keeps one's mind off the movement of the sea.

Meclizine Anti-Nausea Tablets have a high rate of success in preventing and treating nausea and vomiting from many causes, and are especially useful against motion sickness. One table every 24 hours is the recommended dose. When I took one recently on a SCUBA diving trip—four days without setting foot on land—it worked miracles. Meclizine is available form Indiana Camp Supply, P.O. Box 2166, Loveland CO 80539 (100 tablets for $3.79).

For a bigger jolt, available by prescription only, scopolamine comes in a transdermal patch that goes behind the ear. To work adequately, the patch should be applied 24 hours before exposing yourself to motion. As your doctor. My doctor friends who have used scopolamine say it's great. I haven't tried it.

On the alternative side, elasticized wristbands, called Sea-Bands(R), one for each wrist, have a small, plastic button that presses gently on a specific point on the underside of the wrist. Not only have I not tried the bands, I know no one who has. Still, at $12.95 a pair, they would be worth a try for those who prefer to stay away from drugs. Order from (800) 237-5900.

More on Clean Hands

We were curious about Rick Bennett's recommendation (July/August 1993 *WMN*) that we should use povidone iodine for wilderness hand cleaning. When we asked him about it he sent us this response:

"My recommendation for povidone-iodine, i.e. "tamed" iodine, comes from the fact that plentiful hot water is not an option for most remote trips. Hence good hand preparation for meal making or wound care cannot utilize the hot wash-soap mechanism for skin oil removal. Remember washing (greasy) chili dishes in cold water and soap? The saponified fat in cool soapy water re-coalesces and sticks on the dish. Same is true for the hands. If lots of hot water is available soap works fine to remove transient bacteria. So since we can't effectively remove them, let's kill them in place. The detergent povidone-iodine works best because iodine is the least inactivated by organic material, i.e., dirt, grease, on the hands. With small volumes of cool water, much soil will remain on the hands and the free iodide is available to oxidize bacterial protein, i.e., kill'em.

"Have no doubt soap is important. Cold water soaps are available but they are very alkaline and very hard on skin and eyes, which makes them dangerous.

"Some folks are sensitive, if not allergic, to iodine, so I recommend the sanitizer chlorhexidine gluconate. It is available in a detergent called Hibiclens(R) and can be used instead of povidone-iodine."

WILDERNESS MEDICINE INSTITUTE COURSES

P.O. Box 9 - Pitkin, Colorado 81241
Telephone: (303) 641-3572
Mon-Thurs 9 a.m. - 1 p.m.

Wilderness EMT
November 22 to December 16 in Kelly, Wyoming
January 3 - 28, 1994 in Pitkin, Colorado
Cost: $1,395.00

Wilderness First Responder
October 25 - November 5 in Jackson, Wyoming
Cost: $400.00

Wilderness and Rural EMT Module
October 28 to November 9 in Boulder, Colorado
Cost: $500.00

SOLO COURSES

RFD 1, Box 163
Tasker Hill
Conway, New Hampshire 03818
Telephone: (603) 447-6711

NEW! Wilderness EMT Bridge Course
October 11 - 22 at SOLO
Cost: $695.00
This course is just the ticket if you've completed a WFR within the past year and would like to upgrade your certification to Wilderness EMT.

Wilderness First Responder
Costs for the following courses will vary:
October (exact dates TBA) at Wolfcreek, Georgia
October 25 - November 5 at the AMC,
Pinkham Notch, New Hampshire
December 10 - 20 at the Hulbert
Outdoor Center, Vermont

Letter from a friend:

Last winter, after we published an article on anaphylaxis, we received this letter from Dr. Keith Conover.

I just read with interest Mr. Tilton's article in the January/February 1993 WMN. It was a well-researched and informative article. I'd just like to add three notes based on my experience treating anaphylaxis in the Emergency Department.

First, there is a complete spectrum from immediate anaphylaxis to mild allergic reactions. Severe anaphylaxis is usually fatal in less than a minute, whereas mild allergy such as hay fever is only a nuisance. Where people draw the line between severe allergy and anaphylaxis is immaterial, because the treatment is the same regardless.

Second, most cases of anaphylaxis (or severe allergy, depending on your definitions) come on relatively gradually, over a few minutes to an hour or so: the patent first starts itching all over, then gets hives (urticaria). These are like large mosquito-bite wheals. They appear all over the body. Having them on the lips suggests the person is moving from just a bad allergic reaction to true anaphylaxis.

Third, in the case Mr. Tilton presented, the need for epi was obvious. Real life is seldom so cooperative. If someone may be having a severe allergic reaction or anaphylaxis, how do you know for sure he or she needs the shot? If you've never given a shot before, you're likely to be hesitant.

The answer is hoarseness. Hoarseness is the most important sign that a person needs epi. Hoarseness means that the hives are involving the airway, and swelling in the airway is what kills in anaphylaxis. If you don't know if the patient normally has a hoarse voice, ask. "Does your voice sound hoarse?" If the answer is yes, give the epi right away. Don't wait until he or she stops breathing.

Thank you very much.
Keith Conover, M.D.

Note: Dr. Conover lives in Pennsylvania and coordinates the ASRC-CEM Wilderness Emergency Medicine Curriculum Development Project. The Curriculum is partly complete, and completed Lesson Plans are available for the cost of copying and mailing. Order forms and WEMT information are available from: Attn: George C. Pry, EMT, Center for Emergency Medicine of Western Pennsylvania, 230 McKee Place, Suite 500, Pittsburgh, PA 15213-4904; (412) 578-3180. These Lesson Plans may be used locally for WEMT continuing education.

The Appalachian Search and Rescue Conference and Center for Emergency Medicine of Western Pennsylvania also offer WEMT Module classes twice a year. Prerequisites are EMT and search and rescue training. Classes are based on the Curriculum, and are held in the western Pennsylvania mountains. Cost includes food except for field rations, lodging, and the text. Fall dates in 1993:

WEMT I: $100 - November 6-7
WEMT II: $125 - November 19-21

More on Hantavirus

BY KEN THOMPSON

Shortly after we published our article on the hantavirus problem in the Southwest, the July 30th *Morbidity and Mortality Weekly Report* published the following statement:

Precautions for Campers and Hikers in the Affected Areas

There is no evidence to suggest that travel into the affected areas should be restricted. Most usual tourist activities pose little or no risk that travelers will be exposed to rodents or their excreta. However, persons engaged in outdoor activities such as camping or hiking should take [the following] precautions to reduce the likelihood of their exposure to potentially infectious materials.

1. Avoid coming into contact with rodents and rodent burrows or disturbing dens (such as pack rat nests).

2. Do not use cabins or other enclosed shelters that are rodent infested until they have been appropriately cleaned and disinfected.

3. Do not pitch tents or place sleeping bags in areas in proximity to rodent feces or burrows or near possible rodent shelters (e.g., garbage dumps or wood piles).

4. If possible, do not sleep on the bare ground. Use a cot with the sleeping surface at least 12 inches above the ground. Use tents with floors.

5. Keep food in rodent-proof containers.

6. Promptly bury (or—preferably—burn followed by burying, when in accordance with local requirements) all garbage and trash, or discard in covered trash containers.

7. Use only bottled water or water that has been disinfected by filtration, boiling, chlorination, or iodination for drinking, cooking, washing dishes, and brushing teeth.

I've also made some phone calls to check on the advisability of caving. The word from the state epidemiologist is that there are no restrictions on caving in New Mexico. Mice do not burrow in cave floors, and there is no evidence that the hantavirus has entered the bat population.

Did You Hear the One About...?

April Fool's Day, 1992. The prestigious *Journal of the American Medical Association* (JAMA) publishes an article describing the physiology of laughter. No joke! *Reader's Digest* has been printing Laughter, the Best Medicine since Methuselah was in raggedy homespun diapers. Is there any truth in the Digest claim? Several researching docs have now given supporting evidence that a hearty guffaw does indeed have an uplifting effect on the body and on the mind's ability to deal with pain and stress.

Here's how:

1. A gusty chortle alters normal respirations with an increase in breathing rate which ups the oxygen going to your brain and helps clear mucus that may have accumulated in your lungs.

2. A hefty ha-ha aids, to a limited degree, conditioning of respiratory muscles and helps break the pain cycle of some disorders, especially musculoskeletal problems, due to the relaxation following a good laugh.

3. A mighty chuckle temporarily produces a rise in blood pressure and heart rate which increases circulation aiding in the delivery of oxygen and nutrients to hungry tissues body-wide.

4. A cackling cachinnation raises the concentration of immunoglobulin A which helps your immune system defeat germs that cause colds, flu and sinus problems.

Norman Cousins, suffering bed-bound from the terrible pain of ankylosing spondylitis (or was it spondylosing ankylitis?), discovered "that 10 minutes of genuine belly laughter had an anesthetic effect and would give me at least two hours of pain-free sleep." He wrote of his recovery in the now-famous 1979 book *Anatomy of an Illness*. Scientists suspect, but as yet have failed to prove, that a humorous experience increases endorphins, your body's natural painkillers, and adrenalin and dopamine, which can have a positive effect on stress.

"Attitude is Everything" says one of my favorite T-shirts. In an attempt to take laughter seriously (?), science turns its attention to the relationship of psychological states and nervous system effects on immune systems and terms it, for some inexplicable need of science to have a term, psychoneuroimmunology, or PNI for short.

Whatever you choose to call it, laughter may not always be the best medicine, but it most definitely rates as good medicine, and your emotions and your attitude as much, or perhaps more than anything else, determine your well-being.

Here are some hints to improve your laugh-ability:

1. Learn to laugh at yourself: It helps put you at ease, it helps put those around you at ease, and it helps everyone remember that life is far too short to be taken too seriously.

2. Don't forget laughter is infectious: Sometimes, when you don't feel like it, force laughter out. One laugh tends to breed, like fertile rabbits, other laughs, and soon everyone is laughing and no one knows why . . . or cares.

3. Learn what makes you laugh: Monty Python makes me laugh and Bill Clinton doesn't. I've watched the Holy Grail 50 times, and I start giggling even before what'shisname says, "Bring out your dead."

4. Expose yourself, decently, to what makes you laugh: 'Nuff said, eh.

5. Read WMN contributing editor Buck Tilton's hilarious new best-seller *Sex in the Outdoors*, ICS Books, 1370 E. 86th Place, Merrillville IN 46410. (800) 541-7323.

Poisonous Marine Life

BY BUCK TILTON

By now, most of you have come into close personal contact with several species of fish . . . maybe salmon, broiled in lemon butter; pan-fried brook trout; or, perhaps, a succulent slab of blackened mahimahi. Many fish are good for you, and the general encouragement concerning diet in the U.S. has been to consume less red meat and more marine life. Some fish, however, are best avoided since contact can be hazardous to your health. These fish may be poisonous because they can inject venom, or they may be poisonous when they're your dinner. This article is about some fish you shouldn't eat.

The Season of Ciguatera

More commonly diagnosed than any other fish-related illness, ciguatera poisoning follows ingestion of several types of tropical and subtropical reef fish in the Pacific and Caribbean, especially but not only: snapper, grouper, kingfish, amberjack, barracuda, dolphin (not the mammal), wrasse, sturgeon, goatfish, and parrotfish.

Tiny dinoflagellate marine algae called *Gambierdiscus toxicus*, when eaten by herbivorous reef fish, produce toxins that concentrate in the fishes' guts. Among those toxins are ciguatoxin and ciguaterin. When humans eat these vegetarian fish, or the carnivorous fish that have eaten the vegetarians, poisoning occurs. What happens in the sea to produce the dinoflagellates is not known. It's a big problem in the South Pacific, Japan, the Bahamas, Hawaii, Puerto Rico, and Florida, and ciguatera has been diagnosed at least two dozen times in Baja.

Ciguatera toxins give the fish no unusual odor, taste or color, and they are resistant to freezing, cooking, drying, and smoking. Within 24 hours of ingestion, the patient usually complains of gastrointestinal symptoms: nausea, vomiting, abdominal pain, and diarrhea. In mild poisonings these symptoms resolve quickly, but they may last for as long as a week. Neurologic symptoms include paresthesia (strange skin sensations), vertigo, ataxia (loss of coordination), myalgia (muscle pain), weakness, headache, cold/hot sensory reversal, joint pain, and itching. Most weird is an occasional complaint of feeling that your teeth are loose. These symptoms, too, spontaneously resolve, but may reoccur from time to time in subsequent years. Cardiovascular symptoms occur only in patients who have been severely poisoned and may include tachycardia (fast heart rate), bradycardia (slow heart rate) and hypotension (low blood pressure). Sometimes symptoms are worse on a second exposure to the toxins. Death is rare but has been reported.

As of this writing, no lab test will prove ciguatera poisoning in a human. The fish, if there are leftovers, can be tested but sometimes that test is inconclusive.

Treatment is purely symptomatic. Inducing vomiting is useless . . . it's too late. Fluid resuscitation is generally recommended. Nothing reverses the effects of the toxins. Beware eating reef fish in ciguatera-prone areas, especially the larger ones—over five pounds—in ciguatera season. Check with local authorities.

Close encounters with Scombroids

Fish from the family *Scombridae*—tuna, mackerel, skipjack, bonito, wahoo—if stored improperly, tend to grow bacteria, particularly *Proteus morganii*. The bacteria convert some of the flesh of the fish into a substance called, for lack of a better name, scombrotoxin, which produces symptoms of scombroid fish poisoning when eaten by humans. Dolphin fish (mahimahi), though not a *Scombridae*, have been known to cause scombroid poisoning.

Toxic fish usually look or smell spoiled, and sometimes are reported to taste "peppery". Some patients, however, claim the fish tasted fine. The symptoms are those you would expect in someone who overdosed on histamine. Within one hour of ingestion, there is flushing of the face and upper torso, a burning sensation in the mouth, headache, nausea, palpitations, light-headedness and itching. In some patients, vomiting and diarrhea occur, as well as bronchospasm and respiratory distress. Although extremely disconcerting, symptoms always subside within 12 hours.

Treatment, once again, is symptomatic. Inducing vomiting is not recommended. Antihistamines often provide relief. Eating the fish soon after catching and adequate refrigeration prevent bacterial decomposition to scombrotoxin. But the toxin, once formed, will not be destroyed by cooking.

Red Tide in the Morning? Divers Take Warning!

Marine dinoflagellates called *Alexandrium catenella* are normally a minor component of plankton, but, under favorable environmental conditions, they bloom prolifically. In large numbers, this bloom gives a red color to sea water, and thus the name "red tide". Bivalve mollusks—clams, mussels, and oysters—which feed on plankton, will store a considerable amount of *A. catenella*, and someone eating the mollusk may suffer paralytic shellfish poisoning (PSP). A red tide does not have to occur for the dinoflagellates to be present in toxic numbers.

PSP toxin is odorless, colorless, and, unfortunately, resistant to the heat of cooking. Symptoms, which usually begin within 30 minutes of ingestion, include nausea, vomiting, diarrhea, and tingling in the face and mouth. In severe cases, these symptoms progress to muscular paralysis. Death is rare, but has been reported when the paralysis extends to respiratory muscles. No specific treatment exists.

Health departments in areas where PSP occurs routinely test for the presence of the dinoflagellates. Check with local authorities before gathering and consuming shellfish.

Amnesic shellfish poisoning (ASP) may result from ingesting some of the same bivalves, especially in Maine, Massachusetts, Washington, Oregon, California, and along the shores of eastern Canada. The cause is domoic acid, a toxin produced in some plankton. Symptoms include nausea, vomiting, headache, ataxia, dizziness, confusion, disorientation...and memory loss. Some patients never regain the lost memory. ASP is not fatal, and local authorities should be aware of the presence of the toxin.

Fugu—Dining on the Edge

In Japan, puffer fish, precisely prepared by experienced chefs, is considered a great delicacy. The call the dish *fugu*. But puffer fish, and their relatives, contain a highly toxic chemical called tetrodotoxin, and improper preparation may give you a case of tetrodotoxin poisoning. Death occurs in approximately 60% of all cases.

The poison blocks messages from nerves to muscles. Within 10 to 45 minutes after dinner, numbness, and tingling develop. Vomiting, light-headedness, and a feeling of "impending doom" are commonly reported. Salivation, sweating, chest pain, difficulty swallowing and speaking, convulsions, and hypotension may result. Paralysis, difficulty breathing, and bradycardia often lead to death. Some survivors have reported being paralyzed but totally alert.

If a lot of the poisonous fish has been eaten, causing the patient to vomit has a beneficial effect. But life-saving intervention usually requires rapid evacuation to a medical facility.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

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PRE-EXISTING MEDICAL CONDITIONS

Asthma, Seizures, Diabetes, Hypoglycemia

Editors Note:

This issue focuses on the four most common pre-existing medical conditions that clients and students report on pre-trip medical history forms: *asthma, seizure disorders, diabetes, and hypoglycemia.*

Asthma

by Ken Thompson

Most trips I lead for adolescents have at least one asthmatic participant; some have two or three. Since most outdoor pursuits are of the aerobic sort and asthmatic people sometimes have difficulty exchanging air, the disease merits a trip leader's attention. Asthma is an intermittent condition, but when an attack occurs, its onset may be rapid and acute. Because attacks may either be brought on or exacerbated by anxiety, confident action, taken by a knowledgeable and prepared trip leader will prove helpful to a patient's recovery.

Asthma has many triggers: contact with allergens, stress, infections, and exercise may all bring on attacks. Each asthma patient knows what particular set of circumstances may bring on an attack and what the warning signs are. A runny nose, weepy eyes, coughing and anxiety are common precursors to an episode of difficult breathing. Whatever its stimulus, an asthma attack means that certain physiological changes are occurring in the patient's airways: 1) muscle spasms in the bronchioles constrict those passages making the exchange of air more difficult, 2) simultaneously, the system steps up mucus production causing excess mucus to accumulate in the already narrowed bronchioles. These combined actions tend to trap air in the lungs, making exhalation difficult.

Shortness of breath, or dyspnea, marks the onset of an asthma attack and induces anxiety in the patient and in companions. The person will probably stand or sit erect and use accessory muscles to breath. Expiration, normally a quick, relaxed actic will require prolonged, hard work for the asthmatic. In addition to the extra effort required for each exhalation, the breathing rate may be faster than normal, as may the heart rate. You may also notice wheezing audible without a stethoscope and, sometimes, bubbling or gurgling. Air trapped in the bronchioles may cause the chest to remain somewhat expanded at the end of the expiratory phase. Anticipate an irritating cough and expect expectorate near the end of the attack; the body will try to expel mucus that has accumulated in the air passages.

If the condition advances unchecked, the patient will eventually become fatigued from laborious breathing, may complain of "binding" chest pain, and will have difficulty speaking. Ultimately, less and less air may be passed and the exhaustion and resultant hypoxia will bring on respiratory failure.

Prevention and Treatment

As with nearly every other backcountry medical condition, the key to prevention lies in adequate hydration. Bodies low on fluid produce a thicker denser mucus, which forms more solid mucus plugs in the airways than the copious, lighter mucus produced by a well-hydrated body. Since most asthma is allergy induced, keeping the patient flooded with water will also help the body to flush allergens from the system. Steam inhalations may help keep mucus flowing freely, especially at altitude, where cold, dry air constantly evaporates moisture from the lungs. Once an attack occurs, provide supportive care: remain calm yourself; encourage the patient to take deep slow breaths; stand by with the patient's meds in case they are necessary. If on the trail, you'll want to consider finding a place to take an extended break. Asthma attacks are exhausting and the patient will need to recuperate for a while before continuing.

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Medications

The principal of medicating the asthmatic patient is not difficult to grasp--keep the airway open. However, the subtleties of selecting the exact drugs and means of administration for a particular patient are quite sophisticated and confusing--new and better drugs are being developed regularly, patients' needs change, and physicians disagree over appropriate treatments. Here follows a brief explanation of the basics about the various inhalants, pills, liquids, and injections that folks having asthma live with as a daily routine.

Bronchodilators are drugs that relax the bronchial muscles. Common bronchodilators include metaproterenol, isoproterenol, isoetharine, albuterol (Proventil, Ventolin), and epinephrine. Another common bronchodilator is theophylline (Theodur), which is very similar to caffeine. Bronchodilators come in many forms: as inhalants, liquids, tablets, capsules, and injectables.

Steroids work by reducing swelling in the bronchial tubes and by enhancing the effectiveness of bronchodilators. Inhaled steroids prevent bronchospasm from occurring, but they won't stop bronchospasm once it occurs. Examples of inhaled steroids include beclomethasone (Vanceril, Beclovent, Beconase), dexamethasone (Decadron), prednisone, and triamcinolone acetonide (Asthmacort). Oral steroids are strong drugs and debate continues over the safety of their long term use. Nevertheless, some patients rely very heavily upon oral steroids, particularly prednisone, during times when their asthma is hard to treat and is responding to no other drugs.

Another approach to the treatment of asthma is the administration of drugs that prevent allergens from triggering bronchospasm. The most common of these is cromolyn sodium (Intal).

Generally speaking, the route of administration will determine how quickly the medications mentioned above will take effect. Oral medications, capsules and tablets, can take 30 minutes or more to become effective. Liquid medications can be absorbed into the bloodstream a bit more quickly. An injection gets the medication into the bloodstream faster and can be expected to work in five to ten minutes. An inhaled bronchodilator, which goes directly to the lung and is absorbed into the bloodstream very quickly, can often be expected to work in a minute or two.

Medicating asthma patients requires physicians to achieve a subtle balance using combinations of the drugs mentioned above. Many patients regularly take two or three medications for maintenance and have a stronger drug for emergency use (some routinely take seven or eight meds!). Patients should adhere strictly to physicians' guidelines. Nevertheless, the tendency for any medical condition to take on greater significance in the outback suggests that trip leaders understand the following points about asthma medications:

1. Researchers are continually trying to increase the speed and duration of medications and also develop new methods of administering various drugs. Therefore, different patients have been trained to use different methods for using inhalers; and, they will carry various devices to increase the dose that actually reaches the lungs. (Some devices, combined with inefficient technique, leave as much as 90 percent of the medication in the back of the throat.) Furthermore, when lungs are badly constricted and thickly plugged with mucus, inhalants do not reach lung tissue very well.

2. When these chemicals do reach the lungs, they are very quickly absorbed into the bloodstream. Being quite volatile, like alcohol, they readily pass through the blood-brain barrier. This easy access to the body manifests itself in side effects. Expect heart rate and blood pressure to increase, and, if you could take an electrocardiogram, you might see changes in heart rhythm. Therefore, overdoses can be dangerous.

3. Some asthma patients take an anti-histamine as part of the treatment regimen prescribed by a physician. However, **the administration of anti-histamines is contraindicated for most asthmatic patients** (anti-histamines tend to have a drying effect on the lungs). Since many backcountry med kits contain the anti-histamine diphenhydramine (Benadryl), the decision to use it must take into account a patient's specific asthma-related history.

4. Not all inhalants are intended for prompt relief of bronchospasm. **Inhaled steroids or inhaled cromolyn, for example, should never be taken during an asthma attack.** They may cause coughing and may make the attack more severe.

5. Know exactly where asthma patients carry their medications and be prepared to help pull them from a pack.

6. Ask participants to bring a spare set of their medications, which should travel in a separate pack or boat. Some programs include asthma drugs, and physicians' orders, as part of a regular prescription med kit. Typical drugs for inclusion in such a kit might include an albuterol inhaler for use if the patient's inhaler is lost or perhaps broken, and an oral steroid (prednisone) for use when a patient's chronic symptoms are so bad that he or she is unable to sleep, or is otherwise becoming exhausted from respiratory exertion, and none of the patient's regular drugs provide relief. **Consult your advising physician.**

7. In the rare instance that none of the regular medications work and the patient is not getting enough oxygen to support life (look for cyanosis), the injectable epinephrine you carry for anaphylactic shock could be a life-saver.

Exercise Induced Asthma

Exercising, particularly in cold, dry air induces asthma attacks in some people. Doctors think the main culprit in EIA is a

histamine release stemming from the heat and water loss which occurs when exercising in the cold. Educating the participant before the trip may be the only needed intervention. These points are worth remembering and passing on. 1) The well-conditioned will need to breathe less hard than the out-of-shape at any given work load. Therefore, pre-trip conditioning is important. 2) Maximum bronchiole constriction usually occurs around 6 minutes into exercise, but bronchiole spasms begin to relax after about 8 minutes of exercise. Therefore, persistence throegh that first phase of discomfort may lead to relief. 3) Cold, dry air exacerbates the problem; warm humid air ameliorates it. Therefore, breathing through the nose and wearing some sort of face mask (even a bandanna, outlaw style) may lessen the severity of an attack. 4) High concentrations of pollutants may be partly responsible for the condition. Therefore, a trip to the wilderness may be the key to asthma free exercise!

Most asthma patients can participate fully in most outdoor trips. However, there are some difficult to manage cases which may make participants so uncomfortable that certain trips are inadvisable. Key questions to ask include the following: how severe is your asthma?; have you ever engaged in this particular activity before?; and, have you been to this geographic region at this time of year? After explaining the specific rigors of a trip, rely on the patient's judgment. He or she has probably been living with this uncomfortable condition for years, is in regular contact with a physician, and will not want to push too far beyond reasonable limits.

Seizures

by Buck Tilton

Most simply put, a seizure is a sudden, unorganized release of electrical impulses in the central nervous system. This burst of electrical activity often results in a dramatic change in mental status and varying degrees of involuntary muscle contractions. The location of the discharge in the brain, the number of cells affected, and the path of the discharge determine, with other factors, what the seizure looks like. Seizures can be large or small, generalized or localized.

Seizures have many causes, but all are precipitated by some form of stress: emotions, sounds, lights, hypoxia, hypoglycemia, strokes, head injuries, tumors, fever, or liver or kidney failure.

Some who suffer from seizures may be called epileptic. Epilepsy is a term given to seizure disorders when the seizures occur for no known reason and when the seizures are caused by stresses that do not cause seizures in others.

Many types of seizures have been identified. The seizure often requiring emergency care is called a generalized motor seizure or grand mal seizure. Usually the seizure presents like this: An abrupt behavior or attitude change occurs, followed by an "aura" (the patient smells, sees, hears or senses something abnormal). Some people with seizure disorders use the aura to prepare for the upcoming seizure. They are able to alert companions and recline in a safe space.

At the onset of the seizure, the patient loses consciousness and falls to the ground. Muscles stiffen, then contract violently and steadily (the tonic phase). Muscle activity subsides (the clonic phase).

Saliva and blood (from bitten tongue or cheek) may run from the mouth. Urinary and bowel incontinence may be evident. Cyanosis may be noted because breathing often slows or stops. Incoherence and semi-consciousness followed by deep sleep is often seen, and may last 15-60 minutes. This after-seizure condition is called the post-ictal state.

Trip Planning for Someone with Seizures

Seizure prevention must begin long before a trip. The patient must learn as much about the particular disorder as he or she possibly can: what precipitates the seizures, how often they occur, what type they are. They must know the medication, know how it controls seizures, and know its side-effects. You, as a trip leader, should know these things, too. And, as you would do with all medications, make certain that you know where the patient keeps his or her drugs and carry a spare set in case something happens to the main supply. The patient should have been taking a particular drug long enough to be certain of its efficacy.

It is wise to have the patient consult a physician prior to the trip. Increased physical stress and increased metabolic rates can increase the metabolism of the medication, and decrease its effectiveness. Usually if a medication is working, there is no need to restrict activity unless a physician advises it or the person simply chooses to do so.

Depending upon the nature of the trip, some programs restrict participation for people who have an unpredictable seizure disorder. One question to ask is, "Have you had a seizure in the past year?" A positive response to this question should send up red flags. Do you want to risk a participant having a seizure in the middle of a rock-climb, a wild river, or on a knife-edged ridge?

Some common anti-seizure medications include Phenytoin (Dilantin®), Ethosuximide (Zarontin®), Trimethadione (Tridione®), Primidone (Mysoline®), Phenobarbital (Luminal®), and Carbamazepine (Tegretol®).

SEIZURES: *If Field Treatment is Required.*

More seizure sufferers are probably injured by well-meaning first aiders than they are by their seizures. If you're in a first

aid position, stay calm. If you're in time, lower the patient to the ground. Do NOT try to restrain the patient. Do NOT try to jam something into the patient's mouth. Pad under the patient's head, remove sharp or hard objects, remove eyeglasses. If you have to move the patient for safety's sake, do NOT drag him. Lift him.

After the seizure, which should last a maximum of three minutes, roll the patient onto his or her side in order to maintain an airway. Do NOT give the patient something to drink or try to make him stand until the post-ictal state has passed. Speak in a calm reassuring voice. Help him care for needs that may have arisen during the seizure (e.g. excess saliva, incontinence, etc.). When the patient has recovered, perform an assessment to check for injuries. The patient will be weak for a while and should be given food and fluids.

A seizure sufferer on medication who has a seizure should be evacuated to a medical facility for a check-up to discover why the seizure occurred. There is no hurry. Likewise, a person who experiences a seizure for the first time must be evacuated for evaluation.

Diabetes

by Buck Tilton

The human body runs on sugar...glucose to be more precise. It manufactures glucose from foods eaten. Some body parts (muscles, fat, liver) store glucose in case of future needs. Other parts, especially the brain, cannot store a significant amount of glucose. To meet the critical demands of the brain, the blood carries a store of sugar with it at all times. Glucose passes freely across the blood-brain barrier. The rest of the body's cells cannot utilize sugar without the presence of insulin, a hormone produced in the islet cells of the pancreas. But, in those who have diabetes mellitus, the pancreas produces an insufficient amount of insulin (or none).

Sometimes the insufficiency of insulin production is complete, and the diabetic needs to inject insulin on a daily basis. This is often referred to as Type I, or insulin-dependent diabetes. Type II diabetics have partial insulin production, and can control the disease with diet, exercise and/or an oral medication that stimulates the pancreas. With care, both types of the disease can be regulated well enough for extended wilderness trips.

The insulin-dependent diabetic (Type I) must monitor blood sugar levels daily, usually two to four times a day to determine the amount and form of insulin to inject. The process involves pricking a finger and dabbing a drop of blood onto a test strip, then timing and evaluating the results. Depending upon the test strip used, it can be read visually or inserted into a glucose meter. The target range is usually between 100 and 200; anything below 80 is low; anything above 240 is high. Dangerous conditions may occur if blood sugar reaches low levels (hypoglycemia) or high levels (hyperglycemia).

Hypoglycemia can occur when a diabetic exercises too much, eats too little, or takes too much insulin. Due to the brain's critical dependence on blood sugar, an altered level of consciousness, confusion, irritability, permanent brain damage, even death may result in a brief period of time. Signs and symptoms may include any or several of the following: hunger, headache, sleepiness, inability to concentrate, day-dreaming, weakness, irritability, pale appearance, slurred speech, poor coordination, sweating, trembling, personality changes, and dizziness. Onset of signs and symptoms is typically rapid, within minutes.

Hyperglycemia can result when a diabetic gets too little exercise, eats too much, or takes too little insulin. There is no immediate danger since the brain has an adequate supply of glucose, but, if untreated, serious problems--even death--may occur. Irritability and confusion are common. Symptoms include headache, thirst, nausea and the need to urinate frequently. Onset is typically slow, over hours to days. Signs include warm, dry, flushed skin and deep respirations with a "fruity" odor. (This odor is the smell of ketones, which are a by-product of the body's burning fat for fuel. Ketones smell something like fingernail polish remover and have often been mistaken for the smell of alcohol. The presence of ketones in the blood and urine indicate a condition known as ketoacidosis.)

Trip Planning for the Diabetic

Most people with diabetes are extremely aware of how their systems respond to stress and are quite capable of making well-reasoned decisions on a trail. However, a few questions worth asking the parents of diabetic children are: Can the child give his or her own insulin injection? and, Does the child need supervision in determining dosages? These questions show some understanding, on your part, of the disease and will certainly open up an informative conversation among everyone involved.

Diabetics should practice on overnight and weekend trips before undertaking longer wilderness adventures. Overall good physical condition is extremely important. Adequate fluid intake is crucial. The diabetic must make sure blood sugar levels are under control and be familiar enough with his or her condition to be able to make necessary adjustments due to changes in daily routine; changes such as exercise level, variations in diet, and possible illnesses (diarrhea or vomiting).

Meals should be consistent in both timing and quantity and should never be delayed or omitted. Reasonable trail snacks include pretzels, cheese and crackers or sugar free peanut butter, graham crackers, rice cakes, fresh and dried fruit and fruit roll-ups, nuts, popcorn, fresh vegetables, sugar-free cookies, and sugar-free drink mixes.

The diabetic should carry some sort of identification that

relates his or her condition and medications. The diabetic should also carry a readily available sugar source, such as glucose tablets or gel, and make sure everybody traveling in the group knows where the glucose is and how to best help administer it if the need arises. Companions should understand the signs of hypoglycemia.

It is advisable that the diabetic carry twice as much insulin and twice the number of syringes as seems necessary, dividing the insulin so that it's not all in one pack or canoe bag, (just in case some of the medication is lost). Insulin should be carried near the body in situations of extreme cold to prevent it from freezing. Protect insulin from overheating in hot climates.

Dia-Pak® is a 6x8x2.5 inch water resistant, nylon packcloth kit that holds syringes, vials of insulin, glucose meter, blood test strips, alcohol swabs, cotton balls, lancets and lancet pen, glucose tabs and a gel pack that helps maintain temperature. Suggested retail price of the kit is $19.95. Two gel packs are an additional $3.95. From Atwater Carey, Ltd., 218 Gold Run Road, Boulder, CO 80302. 800-359-1646.

Diabetics should check blood glucose often the first few days of a trip. If readings are high, try reducing the amount of carbohydrates consumed before increasing insulin doses.

Plan the upcoming day the night before, including wake-up time, activities and meals. Sleeping late can be adjusted for by merely pushing all meals back. Adjust for late dinners by switching bedtime snacks with dinner time or by reducing morning insulin doses and taking an evening injection of regular insulin just prior to the evening meal.

Carry glucagon for hypoglycemic emergencies. Glucagon is a protein hormone that helps raise low blood sugar levels to normal. A prescription is required. It takes 10-20 minutes to work, and one dose can substantially raise blood glucose.

DIABETES: *If Field Treatment is Required.*

Hypoglycemia must be field treated immediately with **sugared** drinks or sweet foods, or glucose tablets or jellies. Although several companies make sugary gels especially for the diabetic, good field substitutes can be found in honey and tubes of cake decorating frosting. If the patient is too unconscious to take foods or drinks, glucose or sugary substances can be rubbed into the gums. For the deeply unconscious, the American Diabetes Association recommends:

1. inject glucagon.
2. do NOT inject insulin.
3. do NOT give food or fluids until consciousness returns

Evacuation of a hypoglycemic patient depends on whether or not the patient returns to a normal condition, and whether or not the patient wishes to remain in the field.

Hyperglycemia seldom requires emergency treatment because the patient usually recognizes the problem and self-treats. If self-treatment is not working, the patient requires evacuation to a medical facility.

This article was prepared for the WMN with the help of THE DIABETIC TRAVELER, a 6-page quarterly newsletter designed to assist people with diabetes to plan safe and secure travel. Back issues are $3. Subscriptions are $18.95/year. P. O. Box 8223, Stamford, CT 06905. 203-327-5832.

Hypoglycemia

by Ken Thompson

During a mountain rescue group's winter bivouac practice, a strong, experienced member of the team complained of feeling extremely weak and cold and confided in team members that he had suffered from hypoglycemia since childhood. Fearing for his well-being, they bundled him up and hiked half an hour to a nearby mountain-top restaurant, where they consumed prodigious quantities of baked potatoes, prime rib, and German chocolate cake. So fortified, they returned to their snow cave, cast aside their packets of freeze-dried whatever, and slept in the warm glow of a meal well-eaten.

I've taken any number of trips with people in their late adolescence and early adulthood who reported on their pre-trip medical history forms that they had hypoglycemia. But when I heard the rescue group's story, I decided to consult endocrinologists at University of New Mexico's University Hospital (if baked potatoes and German chocolate cake were the treatment of choice, I was ready to contract a touch of this illness myself). The researchers told me that as many as ten to twenty percent of young people have what is commonly referred to as hypoglycemia. However, they prefer to reserve the term "hypoglycemia" for the diabetic and for folks who exhibit low blood sugar levels as a symptom of some underlying medical problem. In the young, otherwise healthy people who participate in wilderness trips, hypoglycemia is most often the result of having natural insulin production that is at the high end of what is considered a normally functioning system. Contrary to what some people believe, it is not a precursor to diabetes. Time of onset of hypoglycemic symptoms ordinarily determines whether the hypoglycemia results from a high-functioning, normal system or whether it stems from a medical problem. Hypoglycemic symptoms that occur about three hours after a meal, or in a "fed" state, fit the typical, high-but-normal pattern. Symptoms which occur eight to 10 hours after a meal, or in a "fasting" state, may signify something more serious. One of the more likely causes of the "fasting" form of hypoglycemia is a pancreatic tumor, which doctors at University Hospital see only once every couple of years.

While the condition merits some special attention on a wilderness outing, it is not cause for undue concern.

Symptoms always include a feeling of tiredness or lack of energy. This may also be accompanied by irritability, irrationality, and, when allowed to progress, exhaustion to the point of collapse. "I just can't take another step," you'll hear the patient say. The treatment, as you might expect, is prevention: plenty of small meals rich in complex carbohydrates. Whole grains, fruits, nuts, and vegetables will provide lasting energy that should sustain the person throughout the day. Highly refined sugars are more likely to stimulate an over-production of insulin, leading to great swings in mood and energy levels, the "flash and crash" that everyone has felt at one time or another. All of us have lowered blood sugar levels when we have fully digested a meal and are beginning to feel hungry for the next. Blood sugar levels vary throughout the day depending upon the amount and type of food consumed, level of activity, insulin production, and other factors. Alan Hale, in his National Safety Network Review of 1989, has justifiably linked this weakened, low blood sugar state to the high incidence of accidents in outdoor programs between the hours of 10 a.m. and noon and between 3 and 5 p.m., precisely during those let's-hurry-up-and-get-to-this-great-spot-I-know-before-we-eat hours. Eat well, eat often, and stay well-hydrated; and, hypoglycemia should not plague you or your traveling companions.

Announcements

Conference

The Fourth Annual Winter Wilderness Medicine conference will be held in Snowbird, Utah, from February 12—18, 1994. Registration fees run from $340 to $575 depending upon your level of certification and the time you register. For further information, contact: Wilderness Medical Society, P.O. Box 2463, Indianapolis, IN 46206; phone - (317) 631-1745, fax - (317) 634-7817.

Scholarship Opportunity

Alaska Wilderness Studies, the academic outdoor education arm of the University of Alaska Anchorage, will offer two $900 scholarships to its 1994 Wilderness Education Association (WEA) National Standard Program in wilderness leadership. The three-credit, month-long class teaches outdoor skills as well as natural history and judgment. To develop greater diversity in future outdoor leadership, Alaska Wilderness Studies is making one scholarship available to women and one to African-Americans, Alaska Natives/ American Indians, or Hispanics. The scholarships cover half the cost of the $1800 program. For scholarship applications or more information, please contact: Todd Miner, Ed.D., Alaska Wilderness Studies, University of Alaska Anchorage, 3211 Providence Drive, Anchorage, AK, 99508; phone - (907) 786-1468, fax - (907) 786-1563.

Research Request

Todd Miner of Alaska Wilderness Studies (see address above) is looking for help in developing a database to begin to empirically examine survival situations in Alaska. He would appreciate hearing from anyone who has examples of data collections on survival from other places or on particular aspects of survival (mountaineering accidents, near drownings, avalanches, hunting incidents, etc.). In addition, he seeks to define the term "survival" so that their potential data base can be compatible with other data bases. Finally, they seek non-anecdotal references from the literature of emergency medicine, military survival, occupational safety, outdoor safety and survival, search and rescue, wilderness medicine, or other fields which might assist them in developing the data base.

Dispatches

Monster Bites Man

Gila monsters are fat lizards with massive heads and short, thick tails, found throughout southern Arizona with subspecies ranging into southern Nevada and Utah. Because Gila monsters are shy lizards who avoid contact with humans, bites are considered rare. But you can provoke them. Take the 15-year-old male who was trying to hold a Gila monster's mouth shut when the mouth shut on his left index finger.

At the emergency room the patient's vitals were normal, there was pain in his swollen finger, and tissue damage inflicted by the lizard's teeth. Pain is considered an important factor since up to 30% of Gila monster bites result in no envenomation. Envenomation usually produces burning pain that peaks within an hour and persists for up to 24 hours. Systemic reactions are uncommon. The patient fully recovered with conservative treatment.

Recommended treatment includes: 1) remove the lizard, which is often a problem since they possess powerful jaws, with as little tissue damage as possible. 2) check the wound closely for broken lizard teeth. 3) clean the wound, and re-clean three times/day. 4) apply NO ice, constricting bands, or cutting and sucking. 5) elevate the bitten extremity. 6) monitor the patient for two to three days or until signs and symptoms go away. Infection is uncommon. Over-the-counter meds are usually effective for pain relief. Tetanus immunization should be up-to-date.

Source: Wilderness Medicine Letter, The official newsletter of the Wilderness Medical Society, Winter 1993.

The Kiss Of Death

Two healthy adult males have died in California from an anaphylactic reaction to the bite of a blood-feeding insect of the subfamily Triatominae, commonly known as the assassin

bug, conenose bug, or kissing bug. Bites are typically painless and acquired during sleep. Both Californians awakened with dyspnea and other systemic symptoms of anaphylaxis before succumbing.

Triatoma species live in rodent nests and burrows, in and around brush on hillsides and in canyons, and in the walls and roofs of buildings. Although deaths are rare, approximately 5% of bitten people have an allergic reaction. Treatment includes antihistamines, epinephrine and corticosteroids. Persons with known allergic reactions to any of the Triatoma species should carry an anaphylaxis kit.

Editor's note: Carolyn and I were floating down the San Juan river in southwestern Utah when we encountered the bite of the conenose bug. We're sure we got them while asleep under the stars on a mesa top above the river. Each of us had from ten to twenty fluid-filled bites on each arm that itched for weeks. They even left small scars, which did disappear in several weeks. We haven't seen the critters personally but understand they are smallish brown bugs, having short wings and a prominent proboscis. Anyone knowing more about the conenose bug, especially how to keep them away, is welcome to send comments to the editor.

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